D.P
1940-41.

D. P File No. 52 1940 —.

Previous reference : D. P 52/40 all pt

Later reference : D-W-105/42

GEN. & REV. SECRETARIAT

Board of Scientific and Industrial Research.

Manufacture of Graphite electrodes
Work of Sub Committee of

D-170/E

INDUSTRIAL RESEARCH BOARD.

BOARD OF INDUSTRIES AND COMMERCE.

Subject..... Manufacture of Graphite Electrodes.

File No. ~~185~~/46f-1 19 .
Dr's file Dated, 21st Decr 40

DEC 23 1940
6446

Submitted.

Letter No.4917 dated 4th Decr (received on 20th Decr.40) from Dr.B.K. Ramprasad, forwarding copy of letter from Professor of Electro Technology of the Institute is put up for kind perusal.

2) It is now seen from the letter of Mr.Aston, that the results of experiments conducted at the Institute, on Graphite Electrodes cannot be published without prior sanction of Government of India.

'X'

3) The Sub-Committee is therefore not able to get at the results as decided in the last Board meeting.

4) Since Mr.Aston, has intimated that the experiments on Graphite Electrodes have been incorporated in the Government of India War scheme, the Director of Board of Scientific Advice will, if approved, be requested to permit Mr.Aston to intimate the results of experiments to the Board for reference of the Sub-Committee.

Not necessary.

6) Report on the experiments conducted at Mysore Iron and Steel Works received to-day from Dr.B.K. Ramprasad, is also put up for kind perusal.

'W'

Secretary,
Industrial Research Board.

89/40-41
24/12
24/12/40.

Chairman)

7) Nil
22/12/40

8) Submits with draft letter to Dr. Ram Prasad for approval

22/12.

NOTE—Contn. Sheet.

WD 06643—GPB—500—20-5-40

Subject.....

File No. of 19 .

-2.

a) The Note on the manufacture of Graphites and Graphite Products in the State, prepared by Dr. P.S. Narayana, forwarded by Gait (vide letter in Abrasives materials Sub Committee file & passed by the Chairman) will be sent to Dr. Ramprasad Convenor, Graphite Electrods Sub Committee for being considered by the Sub Committee & to intimate the views of the Committee by the 18th instant

b) Draft & fair sheet of for Signature as Per notes

10/1/41

10/1

Notes Continued on Page 3.

WD 06643—GPB—500—20-5-40

NOTE.

Subject Manufacture of Graphite and Graphite products in the State.
File No. of 19

OFFICE OF THE SECRETARY INDUSTRIAL RESEARCH BOARD BANGALORE.
No. 381/40-1
Date 28-1-41
on file

12) The brief note of Mr.P.S. Narayana, Consulting Industrial Geologist, on the above subject, received from Government, was referred to the "Graphites" Sub-Committee, to intimate its views.

13) The Sub-Committee met on the 20th January 1941 and a copy of the minutes of the meeting received from Dr.B.K. Ramprasad (Convenor) is herewith put up for kind perusal 'W'

14) The Sub-Committee is of the opinion that 1) the note of Mr.Narayana is superficial and does not furnish detailed information regarding (a) details of proposed processes (b) equipment (c) Buildings etc., 2) that the details of experiments, if any, conducted by him have not been furnished in the note ; 3) that unless Mr.Narayana gives definite and detailed information on all the points, it is very difficult to consider his proposals.

15) The Sub-Committee also considered the possibilities of the production of artificial graphite on a commercial scale.

16) The Sub-Committee have finally resolved that it would be advisable to await

WD 01345—GPB—750 -7-1-41

NOTE.

Subject Manufacture of Graphite and Graphite products in the State.
File No. of 19

JAN 28 1941
No 7584

the results of investigations carried out in the Indian Institute of Science and Mysore Iron and Steel Works, before any action is taken on graphite schemes in general.

'X' 17) Individual reports of Prof.K.Aaton and Mr.N.K. Seshadri Iyengar, on the note of Mr.P. S. Narayana are also enclosed herewith for perusal. The views of the Sub-Committee will be intimated to Government, as called for by them.

'K' 18) The present convenor Dr.Ramprasad, intimates vide his letter No.6230 dated 21st January 1941, that the Sub-Committee desire that Mr.D.V. Krishna Rao of the Mysore Iron and Steel Works, be the Convenor of this Sub-Committee, in future, as he is incharge of the experiments conducted at Bhadravati. This may kindly be approved.

Dated 28th Jany.'41 Secretary. 28.1.41.

Chairman) 19) Nil

20) 1) Reply to Govt. communication 29/1/41

21) 2) Letter to Mr D.V. Krishna Rao
Dr B.K.R. Prasad

22) 1) Letter issued to Govt on 31-1-41 } 30/1/41
Wpg Draft Letter put up } Issued on 31-1-41

OFFICE OF THE SECRETARY INDUSTRIAL RESEARCH BOARD
No 174
Date 30/1/41
BANGALORE

NOTE.

Subject Manufacture of Graphite Electrodes and other products.

File No. of 19

OFFICE OF THE SECRETARY INDUSTRIAL RESEARCH BOARD. No. 647/40-1 Date 15/5/41 One file BANGALORE.

-5-

Dated, 15th May 1941.

Submitted.

25) Mr.D.V. Krishna Rao of Mysore Iron and Steel Works was appointed as the Convenor of the Graphite Electrodes Sub-Committee with effect from 31st January 1941 vice Dr.Ram Prasad, as recommended by the Sub-Committee and approved by the Chairman.

26) It is now understood that Mr.Krishna Rao is transferred to Calcutta. Since Dr.Ram Prasad was the convenor from commencement and as he is conversant with the working of the Committee, it is proposed to reappoint Dr.Ram Prasad as the Convenor.

27) The successor of Mr.Krishna Rao, Superintendent, Open Hearth Furnace of the Mysore Iron and Steel Works will be appointed as a member of the Sub-Committee vice Mr.Krishna Rao.

Secretary.

Chairman)

OFFICE OF THE FIRST MEMBER OF COUNCIL MAY 16 1941 No. 1192

OFFICE OF THE SECRETARY INDUSTRIAL RESEARCH BOARD. No. 333/40-1 Date 19/5/41 BANGALORE.

28) 16/5/41

29) Draft & Fair Sheet 28/5/41

30) Issued 28/5

NOTE.

Subject Manufacture of Graphite Electrodes & other Products

File No. of 19

31) Dr. Rama Prasad will be requested to intimate the action taken on the Resolution given B.S (Communicated to the Convenor on 4.4.41) & to forward Progress Reports for the infm. of the Board.

Subt for orders

JB 27.X.41. 32) [illegible] 28/10

33) Draft letter put up for appl.

34) Letter dated 26.10.41 of Mr. P. S. Narayana intimating that work on Graphite Products & electrode has also been taken up by them is for perusal. Work in this direction is already in Progress at N.P.L. A copy of this letter will be forwarded to the Convenor & to N.P.L., to get into touch with Mr. Narayana & find out if there is any overlapping of work. In the meanwhile, Mr. Narayana may also be requested to intimate the details of work done by them & other developments. 35) Yes

36) Subt for orders [illegible]

JB 30.10.41

30.X.41. 37) Letter to Dr. Prasad under Vide Para B1.

JB 3/11/41

9/1/57

BOARD OF INDUSTRIAL PLANNING AND COORDINATION.

BOARD OF INDUSTRIAL PLANNING AND COORDINATION.

Graphite Electrodes & Other Products

File No. of 193

General and Revenue Secretariat

and also states that to facilitate the expl investigations, it is necessary to provide a suitable high pressure press & solicits instructions if he may be obtain quotations for the press.

2. The Graphite experiments are conducted by the M.I.S.W at Bhadravati & the Sub Cmte's kind reference is invited to the resolution of the Sub Committee (Flag "P") and the observation of the Board at the meeting held on 17.11.61 (Flag "Q") re: Electrode Plant. The Chairman, M.I.S.W informed the Board at the meeting 17.11.61 (Flag "Q") that he would take necessary action as suggested by the Sub-Committee. It is not known whether any action has been taken by the M.I.S.W in this behalf.

The expenditure on this expl investigations is financed by the Works & forms a routine part of the activities. Apparently the Electrode Plant, high Pressure Press required in connection with the investigations, should normally be provided by the Works. Perhaps the Gl Manager, M.I.S.W may be requested to kindly take necessary action in this behalf &

Copy of letter received in the Secretariat may be kept in this file.

12.8.61

BOARD OF INDUSTRIAL
PLANNING AND COORDINATION.

Graphite Electrodes &
Allied Products—

General and Revenue Secretariat | File No. | of 193 | [App. F. III—2

Serial No.

a From Dr. B.K. Ramprasad, Gl. Supdt, Jog Project and Convenor, Graphite Electrodes Sub-Committee

State that he would forward a further report re: work done in 41-2 by the Sub Committee. Invites attention to the minutes of the Sub Committee meeting held on 27.10.41 re: obtaining quotations for the Electrode Plant and also urges the immediate necessity of purchasing a High Pressure Press

38 The Reporting work done by the Sub-Committee during 1941-2, will be awaited.

39 It will be seen from the Report that Expts are being continued and a few modifications are being tried such as the use of iron oxide Sodium Silicate etc for binding the material before graphitising. The Convenor invites reference to the minutes of the Sub Committee meeting held on 27. re: the desirability of obtaining quotations for a Small electrode Plan

NOTE—Contn. Sheet.

WD 0544—GPB—30,000—2-9-38

BOARD OF INDUSTRIAL PLANNING AND COORDINATION

General and Revenue Secretariat.

File No. Graphite Electrodes & Steel Products of 19

[App. F. III-2

Serial No.

Dr. Ramprasad, Convener informed accordingly. For order.

41 For perusal. Copy of letter received from the Genl. Manager, H.S.L. regarding the present stage of the experiment is placed in the file (flag 'F') for perusal. The General Manager may also be requested to send an estimate for the press referred to in the last para of the Convener's letter (a copy of the letter being sent to him).

Dev Secy)

12-8-62

42

15/8/62

15/8

43

Draft letter submitted for appl

20/8/62

44 Done

21.8.62

Issued No. D.P. 104/62-3 Gl Manager
Dr. Ramprasad D.P. 105/62-3 dt 26.8.62

28/8/62

NOTE-Contn. Sheet.

Graphite Electrodes
Investigations

1/113

BOARD OF INDUSTRIAL PLANNING AND COORDINATION
General and Revenue Secretariat

File No. of 19

Serial No.

Letter No. G.1038/31.8.62
from the Gl. Manager M.S.S.W.
Madras Copy his letter addressed to
Dr. B.C. Ramprasad re: High Pressure
Probes:

4/ The Gl Manager has called for the detailed specifications from Dr. Ramprasad. Initial Report and estimate may be awaited.

Dh3
5/9/62

46 D/
7.9.62

4p No reply has been received from the M.S.S.W. If after, the Gl. Manager will be requested to send a report in the matter, early

Dh3
16/10

48 D/
17.10.62

49 D & T letter put up.

Dh3
4/11/62

50 D/
7/11

Issued No. 271/62-3, 272/62-3
9.11.62

Dr The Gl Manager M.S.S.W.
& Copy to Dr B.C. Ramprasad
Reminder

Letter No. 1672 dated 10.XI.62

BOARD OF INDUSTRIAL PLANNING AND COORDINATION.

General and Revenue Secretariat

Graphite Electrods and other Products = investigation

File No. 52 of 1940-1 [App. F. III-2

Serial No.

from the General Supdt. Vog Scheme (Cameron of the Sub Committee) intimating that he he has discussed the matter with Rao Krishna Rao of the Iron Works &c.

51 The letter is for perusal. The estimate promised to be sent over may be awaited.

DS 13/11/42 (Dr. Prasad on depute to be summ on his return as per rules) 52 DS 16/11/42

Reminder No. DP 391/17.12.42

Copy to Dr B.K. Ram Prasad No. DP 392/17.12.42

DS 17/12

54 This file will be closed at this stage for the present

55 Please get a report on the latest position pr the GM; MSW.

DS 8.3.43

56 DP's Dft letter to Dr. Ram Prasad enclo

DS 11/3 (say T.S. 11/3)

Issue. DP 291/43, 11.3.43.

Letter No. 309 & 393/43 from Dr Bok.

NOTE—Cont. Sheet.

WD 04155—GPB—55,000—23-10-41

Serial No.

Ram Prasad, Commr, Graphite Electrodes to Committee intimating that he has called for a report from the M. D. Div of ____

57) Dr. Ram Prasad is the Commr of the Graphite Electrodes & Others Products Sub Committee. The actual expts are carried out at the M. D. Div. He has also suggested that it is necessary give an Assistant to the Officer conducting the investigation, so that the work may be actively pursued. The desirability of providing an extension from is also raised by Dr. Ram Prasad. Apparently the progress of this investigation during the latter part of 1942-3 has not been much. From the letter of Dr. Prasad, it looks as though he is not in favour of dissolving this Sub Committee. In the circumstances, this Sub Committee may be treated as the Sub Committee of the Bd of Sc & Ind Res & further Progress watched.

58 The Supdt. Manager will be requested to send a defailed note of work done from the Commencement.

BOARD OF INDUSTRIAL PLANNING AND COORDINATION.

Serial No.

Ram Prasad, Convener, Graphite Electrode Sub committee intimating that he has called for a report from the M. I. Dn of

57) Dr. Ram Prasad is the Convener of the Graphite Electrode & Others Product Sub Committee. The actual exps are carried out at the M. I. Dn. He has also suggested that it is necessary to give an Assistant to the Officer conducting the investigation, so that the work may be actively pursued. The desirability of providing an extrusion Press is also raised by the Dr. Ram Prasad. Apparently the Progress of this investigation during the latter part of 1942-3 has not been much. From the letter of Dr. Prasad, it looks as though he is not in favour of dissolving the Sub Committee. In the circumstances, this Sub Committee may be treated as the Sub Committee of the Bd of Sc & Ind Res & further Progress watched.

58 The Secy. Manager will be directed to send a detailed note of work done from the Commencement

expeditiously. If appd the G. of I are to intimate whether the grant also for Camp be provided for the funds given works, if not for what reasons for order.

Dft. please
TO 1/5.

Dft letter Subtr

TO 5/5/44

Pp 353/43 & 57/44.

Subtr

In connection with Dr Bhandarkar's proposal - I the file - which has been referred to Dr B.C. Ramchandra the latter offers desires that the Pp file on the same subject may be given to him for giving further remarks as minutes & then the file to Dos will be sent to A.I.

TO 18/5/44.

Letter No. G 7020 of 19-5-44 from the Secy Govt of India stating that the G. of I state

Investigations of the Dept
Graphite electrode

would provide the necessary funds.
He (Prem) has also stated that the
investigation would be undertaken from
when it was left by Dr. Prasad
with the Central

For final orders
The file is linked for the
Dept.

Letter sent issued as per draft note

24/5/44

25/5/44

(File linked to DF 100/42
DNP. 6992 - Bhandarkar's
Letter on Carbide —
sent to Dr R. Prasad
for final
The Reid back
to Dr R. Prasad
on 29/5/44 linked to
the file)

(Further action vide D. on file
No. 100/42 - DNP. 7668. It
has been ordered that work on
graphite may be continued at
Bhadravati

Letter to Dept. concerned —

Action has separately been taken
to continue the investigations on graphite electrodes
at the M. Dept (vide Dept 100/42 linked)
Dr B. K. Ram Prasad, convener of this Sub
Committee has left Mysore Centre and
there appears to be no need to
reconstitute this sub committee after

Graphite electrodes Lib committee 4203

C. F. 74.] D.P. 52/40 7020

Routine Notes. D.P. 260,

WD 07111—GPB—50,000—4-44

[To be used only for notes, requisitions, etc., not intended for permanent record.]

B.S.D.R, as the work expected of this Committee has by been completed & the further investigations are now continued by the M.E.P.C. If & when necessary a Separate Sub-Committee may be constituted, which could be set to later on. If appt- the Subcommittee can be dissolved- for orders Please note the personnel of the Sub Committee as shown this was sanctioned

Dd 19/4/45 Dd 24/4/45

Please see Para 8 of the Annual Report of the B.S.D.R (Plans in file) for personnel of this Sub Committee

The Committee was constituted by the Bd of D.P. in the year 1940-1.

The Sub Committee may perhaps be dissolved for reasons stated above

Dd 26/4 Dd 27/4/45

Dd 27/4 Agreed) May be dissolved Ce 30/4

Ref letter 2.5.45 Ce 3/5 Dd 4/5

Dd 3/5 Dd 16/5/45 Dd 8/5

OFFICE OF THE MINISTER FOR PUBLIC WORKS

2 MAY 1945

No. 825

N.B.—Should routine notes be written on small slips, the notes must be copied, or slips pasted on this form.

Graphite Electrode Sub Committee

C. F. 74.]

Routine Notes.

[To be used only for notes, requisitions, etc., not intended for permanent record.]

I.P 320 25.5.45

To The Gen. Supts. for Power Schemes.

States that the above Committee is dissolved, as the work entrusted to it has already been completed & further investigations are now carried on at M.I.S.W.

B.
29/5

N.B.— Should routine notes be written on small slips, the notes must be copied, or slips pasted on this form.

Confidential.

BOARD OF INDUSTRIES AND COMMERCE.

Proceedings of the Meeting of the Industrial Research Bureau Sub-Committee of the Board of Industries and Commerce held in the Chambers of the First Member at 1 p.m. on Tuesday the 7th November 1939.

Chairman.

Rajamantrapravina N. Madhava Rau, B.A., B.L.,
First Member of Council.

PRESENT.

1. Dr. J. C. Ghosh, D.Sc., F.N.I.,
   Director, Indian Institute of Science, Bangalore.
2. Mr. M. S. Ramchendra Rao, B.A.,
   Director of Industries and Commerce in Mysore.
3. Mr. M. Venkatanaranappa, B.A.,
   Chairman, Mysore Iron & Steel Works, Bhadravati.
4. Mr. M. A. Srinivasan, B.A.,
   Government Director of Industrial Concerns.
5. Mr. S. G. Forbes, E.E., B.Sc., (E. & M.E.) Mem. A.I.E.E.,
   Chief Electrical Engineer in Mysore.
6. Mr. T. G. Rama Iyer, B.A.,
   Director of Agriculture in Mysore.
7. Mr. B. Rama Rao, M.A., D.I.C.,
   Director of Geology in Mysore.
8. Mr. B. K. Murthy, B.E. (Mech.), M.Sc. (Techl.), A.M.C.T.,
   Principal, Sri Krishnarajendra Silver Jubilee Technological Institute, Bangalore.
9. Mr. A. Venkata Rao Telang, M.A., F.Inst.P.,
   Professor of Physics, Central College, Bangalore.
10. Dr. B. Sanjeeva Rao, M.A., Ph.D. (Lond.),
    Professor of Chemistry, Central College, Bangalore.
11. Mr. E. K. Ramaswami, B.Sc., A.C.G.I., M.A.S.M.E., M.I.E. (India),
    Principal, College of Engineering, Bangalore.
12. Dr. M. N. Ramaswamy, M.Sc., D.Sc. (Munich),
    Forest Chemist.
    (Represented Chief Conservator of Forests in Mysore, absent on deputation).
13. Mr. P. H. Krishna Rao, M.A.,
    Secretary to Government, Development Department.
14. Mr. V. Venkatachar, M.A., B.Com.,
    Assistant Director of Industries and Commerce (*Secretary*).

ABSENT.

1. Mr. S. G. Sastry, B.A., M.Sc. (Lond.), F.C.S.,
   Director, Sandalwood Oil Factory, Mysore.
2. Mr. C. Abdul Jabbar, B.A.,
   Chief Conservator of Forests in Mysore.

(Letters expressing their inability to attend the meeting were received from them).

Formation of a Central Industrial Research Board in Bangalore.

The Chairman referred to the decision adopted by the Board of Industries and Commerce at its meeting held on 15th July 1939 in favour of bringing into existence a Central Industrial Research Board in Bangalore both to co-ordinate research work carried on in the several Government Departments as well as to suggest new problems of industrial importance and guide research work on such lines as to prevent over-lapping, and observed that the questions relating to the personnel of the proposed Board and the programme of work should be considered at this meeting.

The Chairman requested Dr. J. C. Ghosh, Director, Indian Institute of Science, to give an idea regarding the constitution and working of the Bengal Industrial Research Board.

Dr. J. C. Ghosh explained that the Bengal Industrial Research Board was constituted of Technical Officers of Government, Professors of Science of University, Representatives of Chambers of Commerce and Technical Experts. The Board sent out enquiries to important industrial and commercial concerns, Chambers of Commerce, etc., to elicit information regarding problems of industrial importance and a Sub-Committee of the Board selected from out of the subjects suggested only such as were of immediate industrial importance. The subjects so selected were referred to Sub-Committees consisting of technical experts or University for detailed investigation and report and the funds required by them were placed at their disposal out of the funds granted to the Board by Government.

Dr. B. Sanjeeva Rao referred to the Committee of Scientific and Industrial Research in London and said that this Committee was conducting research work of scientific and industrial importance through its several Sub-Committees appointed for the purpose and was making the results of research work available to all those interested in them.

Mr. S. G. Forbes, explained that in U.S.A. there is a Central Research Institution which is undertaking research work of all kinds referred to it by industrial concerns, commercial and scientific bodies, etc., and making the results available to them. The institution was meeting the expenses involved out of the funds placed at its disposal by those entrusting it with research work.

Continuing, he said, that in view of the rapid industrial development of the country, a Central Research Board should be brought into being immediately and might be affiliated with such institutions in Britain and America to facilitate mutual exchange of information.

Mr. M. Venkatanaranappa suggested that in view of the diversity of the problems to be considered by the Board, investigations and research work on the several subjects must necessarily be carried on by a number of Sub-Committees consisting of technical men actually engaged in the particular line of research.

All the members were agreed that there was immediate need for a Central Research Board in Bangalore with a view to furthering scientific and industrial research of practical importance.

The Committee adopted the following Resolutions :—

This Committee recommends that, in view of the rapid industrial development that has taken place in Mysore and the need to undertake research on problems of industrial and commercial importance and value both to Government and aided industrial concerns working in the State, Government be moved to constitute at an early date a Central Industrial Research Board in Bangalore consisting of some of the heads of all Government Technical Departments, the Director of the Indian Institute of Science, Scientists engaged in research work, Representatives of Industrial Concerns in the State including the Kolar Gold Mining Companies.

This Committee recommends that the proposed Industrial Research Board should be independent of the Board of Industries and Commerce and should have a small Executive Body to attend to routine work;

that the functions of the Board will be to co-ordinate research work that is now being carried on in several technical departments of Government, to suggest problems of immediate or ultimate industrial importance for investigation and to guide research work on such lines as to prevent over-lapping, waste of time and money;

that such research work be carried on by Sub-Committees appointed for the purpose and in such places where facilities are available; and

that the Board may meet once a quarter to review the work of the Sub-Committees and to consider other matters with a view to furthering the scheme of research work.

The question of the programme of work was then taken up for consideration.

In this connection, the Director of Industries and Commerce observed that he had collected information from all the Government and Government aided industrial concerns as to their requirements of raw materials and semi-processed goods which they were importing and the imports of which had been rendered both difficult and costly owing to the outbreak of hostilities in Europe. A list of such materials required by them had been circulated to members for information.

Proceeding, the Director said, that at the moment the possibilities of locally manufacturing such materials as were now being imported by the industrial concerns in Mysore for purposes of manufacture, as furnished in the list, might be taken up for investigation in the order of importance. This suggestion met with general approval.

The Committee examined in detail the various raw materials and semi-finished goods that the industrial concerns were importing and constituted the following Sub-Committees to examine and report the possibilities of manufacturing them locally.

(i) Manufacture of Super-phosphates.

This constituted an important manure which was at present being imported. The question of preparing this chemical from bone meal is at present engaging the attention of Mr. S. G. Sastry, Director, Sandalwood Oil Factory, and Dr. Krishnaswamy of the Indian Institute of Science. The following Sub-Committee was constituted to examine the possibilities of manufacturing it locally :—

1. Dr. J. C. Ghosh, D.Sc., F.N.I.,
   Director, Indian Institute of Science (*Convener*).
2. Mr. S. G. Sastry, B.A., M.Sc., F.C.S.,
   Director, Sandalwood Oil Factory, Mysore.
3. Dr. K. R. Krishnaswamy, B.A., D.Sc., (Lond.), F.I.C.,
   Indian Institute of Science.

Dr. Ghosh to be the co-ordinating member and convenor.

(ii) Manufacture of Hydraulic Lime.

This is required for paper and other industries. This is, at present, being imported from Belgium and some quantity from Dhronachalam and Rampur. There are good lime stone deposits near Voblapur and other places in the State. The Director of Geology has already carried out some investigations, the results of which are reported to be encouraging. The further investigation of the question was referred to the following Sub-Committee :—

1. Mr. B. Rama Rao, M.A., D.I.C.,
   Director of Geology (*Convenor*).
2. Dr. H. S. Sharma, Ph.D. (Lond.), D.I.C. (Lond.)
   Chemist, The Mysore Paper Mills, Bhadravati.
3. Mr. Balakrishna, B.A.,
   Mysore Iron and Steel Works, Bhadravati.
4. Mr. G. Gundu Rao, M.Sc., A.I.I.Sc.
   The Mysore Sugar Co., Ltd., Mandya.

(iii) Manufacture of Ferro Manganese, Ferro Silicon, etc.

These are, at present, being imported from abroad by the Mysore Iron and Steel Works. Mr. Venkatanaranappa said that Mr. D. V. Krishna Rao was conducting experiments in regard to its manufacture at the works.

It was decided that the experiment be continued at the Iron and Steel Works and that Dr. B. K. Ramprasad, Government Electrical Department, be associated with Mr. D. V. Krishna Rao.

(iv) Magnesite Bricks.

These are at present being imported from Messrs. Burns & Co.'s Potteries at Raniganj.

Mr. Rama Rao said that he had conducted some experiments but that they were discontinued owing to lack of suitable raw material for the purpose.

A suggestion was made that the brick plant in the Mysore Iron and Steel Works may be made use of for making these bricks.

The Chairman of the Mysore Iron and Steel Works was requested to send a Note on the subject for the consideration of the Board.

(v) Grinding Bodies for the Cement Plant.

These are also used in the Porcelain Factory. They are now being imported.

The Chairman, Mysore Iron and Steel Works, was requested to send a Note with samples to the Director of Geology for investigation and report.

(vi) Manufacture of Caustic Soda.

This is required by the Mysore Paper Mills, and by several other industries, such as Soap Factories, etc.

It was pointed out that the marketing of chlorine obtained as bye-product in the manufacture of caustic soda presented a problem. Further, the Okha Works and the Mettur Chemicals who are likely to start work in the near future might be able to supply the demand for caustic soda in Mysore. The question as to the quantity required by industrial concerns in Mysore, the outlets for the disposal of chlorine obtained as bye-product and the chances and scope for the industry, may all be investigated by the following Sub-Committee:—

1. Mr. M. A. Srinivasan, B.A.,
   Government Director of Industrial Concerns (*Convenor.*)
2. Mr. S. G. Sastry, B.A., M.Sc., F.C.S.,
   Director, Sandalwood Oil Factory.
3. Dr. B. K. Ramprasad, M.A. (Hon.), D.Sc., M.I.E. (Ind.)
   Government Electrical Department.
4. Dr. K. R. Krishnaswamy, B.A., D.Sc. (Lond.), F.I.C.,
   Indian Institute of Science.

(vii) Manufacture of Glauber Salt.

This is obtained as a bye-product in the manufacture of Sodium Bi-chromate. A scheme for the manufacture of the latter was under consideration by a Sub-Committee of the Board of Industries and Commerce. It was therefore decided that this question might be pursued by that Sub-Committee, and that the question of manufacturing Glauber Salt locally in view of there being a large demand for it may be investigated by (1) Dr. Krishnaswamy and (2) Dr. B. K. Ramprasad.

(viii) Manufacture of Alum.

Alum is required by the Paper Mills Co., by the Water Supply Department, etc. A large quantity of it is at present being imported.

The Director of Geology said that he had been conducting experiments with raw materials available in Mysore. Kemmangundi deposits are found useful. The further investigation of the question was entrusted to the following Sub-Committee:—

1. Mr. B. Rama Rao, MA., D.I.C.,
   Director of Geology (*Convenor*).
2. The Director of Public Health.
3. Mr. S. G. Sastry, B.A., M.Sc., F.C.S.
   Director, Sandalwood Oil Factory, Mysore.
4. Dr. B. K. Ramprasad, M.A. (Hon.), D.Sc., M.I.E., (Ind.)
5. Mr. N. K. Seshadry Iyengar, B.A., M.Sc.,
   The Mysore Paper Mills, Ltd., Bhadravati.

(ix) Manufacture of Carbon Electrodes.

The Chairman, Mysore Iron and Steel Works, said that some experiments were being conducted in the Works with magnesite, making use of a Press obtained from the Government Electric Factory. The results were not encouraging. The passage of electricity was not good, which reacted on output.

Dr. Ghosh observed that Graphite Electrodes were very costly.

It was recognised that this was a serious problem and should be tackled immediately by the following Sub-Committee:—

1. Dr. B. K. Ramprasad, M.A. (Hon.), D.Sc., M.I.E., (Ind.), (*Convenor.*)
2. Mr. D. V. Krishna Rao, B.A., of the Mysore Iron and Steel Works,
3. One Chemist from the Mysore Paper Mills, and
4. One from the Indian Institute of Science.

(xxiv) Manufacture of Sodium-Bi-Chromate.

There is a good demand for this chemical also by the tanning and other industries in the State. A separate Sub-Committee of the Board of Industries and Commerce has been appointed to go into this question. Their report may be awaited.

The Sub-Committee resolved that these recommendations may be communicated to the Board of Industries and Commerce and to Government for consideration.

V. VENKATACHAR,
Secretary.

N. MADHAVA RAU,
Chairman.

WD 2977—GPB—200—12-12-39.

(xxiv) Manufacture of Sodium-Bi-Chromate.

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The Sub-Committee resolved that these recommendations may be communicated to the Board of Industries and Commerce and to Government for consideration.

V. VENKATACHAR,
Secretary.

N. MADHAVA RAU,
Chairman.

WD 2977—GPB—200—12-12-39.

(xvi) Manufacture of Potassium Permanganate.

The Director of Geology said that he had sent up proposals to Government for undertaking experimental work. It is proposed to prepare this by making use of ore available locally by electrolytic process.

The Committee decided that a scholar of the Indian Institute of Science may also be associated with the above work proposed to be carried out by the Director of Geology.

(xvii) Manufacture of Corundum Wheels, Sand Paper, etc., Abrasive Materials.

Dr. J. C. Ghosh said that some experiments had been conducted in the Institute in this respect.

The Director of Geology had also done some experiments and one Mr. P. Satyanarayana, Consulting Industrial Geologist, Malleswaram, Bangalore, has also done some work on it.

The Director of Geology was requested to get into touch with Dr. J. C. Ghosh and also to associate Mr. Satyanarayana with the work.

(xviii) Production of Cinchona.

Research work on cinchona taken up by Dr. M. N. Ramaswamy of the Forest Department may be continued and he be requested to send periodically progress reports to the Board.

(xix) Manufacture of Water-proof Fabrics.

This had been considered by the Board of Industries and Commerce. The note promised by the Director of Sandalwood Oil Factory may be obtained and the question pursued.

(xx) Mixture of Petrol and Power Alcohol.

Different percentages of petrol and ethyl alcohol which would give the best results as engine fuel should be tried in the Engineering College. If facilities are available motor car running tests may also be conducted. This must be done in a continuous manner.

The work may be carried out by the Principal, Engineering College, and a Chemist from the Mysore Sugar Company to be associated with him.

(xxi) Testing of Textile Samples.

There were ample facilities for the testing of cotton samples in the Indian Central Cotton Committee's Laboratories at Matunga.

In regard to testing of wool samples, etc., the Live-Stock Expert of the Department of Agriculture may be associated with the Principal of the Sri Krishnarajendra Silver Jubilee Technological Institute.

(xxii) Sulphur.

The Committee considered that as this was an important material required by most of the industries, its preparation from ores available locally should be investigated.

The Director of Geology said that he had been conducting experiments but as good ore had not yet been discovered, it had not been possible to arrive at any workable data.

The Committee considered it desirable to continue the investigation though this was of a long-range character and the Director of Geology agreed to do so.

(xxiii) Manufacture of Copper Sulphate.

There was a good demand for copper sulphate both by the Agricultural Department and the Forest Department. Mr. M. A. Srinivasan mentioned that the Mysore Chemical Manufactures, Limited would be manufacturing this article shortly.

(x) Manufacture of Soaps required by the Textile Mills.

The Government Director of Industrial Concerns explained that he had obtained samples of Marseilles soap from the Mysore Spun Silk Mills, Ltd., Channapatna, and had arranged to supply similar soaps to them, and he was also arranging to supply them to Sri Krishnarajendra Mills, Ltd., Mysore, and the Bangalore Woollen, Silk and Cotton Mills, Ltd.

(xi) Manufacture of Plastics.

Experiments in regard to manufacture of plastics were being carried on in the Indian Institute of Science by Mr. Srinivasaiya, by the Mysore Iron and Steel Works and by the Government Electric Factory.

The Chairman, Mysore Iron and Steel Works, said that they have ordered for machinery to try the manufacture of plastics on a semi-commercial scale. The following Sub-Committee was entrusted with the further investigation of the problem :—

1. Mr. V. Paul, Indian Institute of Science.
2. Mr. Ahmedali, Chemist, do
3. Mr. M. Srinivasaiya, B.A., F.I.I.Sc., of the Indian Institute of Science.
4. Mr. V. Rama Rao, B.Sc., of the Government Electric Factory.

(xii) Manufacture of Copper Wire, Galvanised Pins, etc.

The drawing of copper wire has been undertaken by the Government. Electric Factory. The question of manufacturing galvanised steel pins and shackle for insulators may be investigated by the Government Director of Industrial Concerns with the co-operation of the Industrial Engineer and a representative of the Mysore Iron and Steel Works.

(xiii) Manufacture of Tube Glass.

The Director of Industries and Commerce said that the Mysore Glass and Enamel Works proposed to undertake the experimental manufacture of tube glass.

The Committee decided that the Director, Indian Institute of Science, may persuade one of the students in the Institute also to undertake this work.

(xiv) Manufacture of Chemicals, Drugs and Essential Oils.

The following Sub-Committee was constituted to go into the question :—

1. *Sastravaidyapravina*
   Dr. S. Subba Rao, B.A., M.B.C.M., L.R.C.P. (Lond.), M.R.C.S. (Eng.), D.P.H., Retired Senior Surgeon (*Convenor*).
2. Dr. B. T. Narayan, B.A., Ph.D., D.Sc.,
   Bio-Chemist, Department of Agriculture.
3. Mr. B. H. Krishna, M.Sc., A.I.C., A.I.I.Sc.,
   Industrial and Testing Laboratory.
4. Dr. B. L. Manjunath, B.A., M.Sc., D. PHIL.,
   Professor of Organic Chemistry, Central College.
5. Dr. P. C. Guha, D.Sc., (Cal.) of the Indian Institute of Science.
6. Dr. L. S. Doraswami, M.Sc., (Lond.) Ph.D., (Lond.),
   Superintendent of Government Gardens.
7. Mr. M. S. Krishna Rao,
   Superintendent, Government Soap Factory.
8. Dr. M. N. Ramaswami, M.Sc., D. Sc.,
   Forest Chemist, Forest Research Laboratory.
9. Mr. B. Sanjeeva Rao, B.A., M.Sc., (Mad.), F.I.I.Sc., of the Indian Institute of Science.

(xv) Manufacture of Cement Asbestos.

The Director of Geology said that some experiments had been conducted and as cement and asbestos were both available in Mysore, it was worthwhile taking up the investigation of this question.

The following Sub-Committee was constituted to examine this subject :—

1. Director of Geology in Mysore (*Convenor*).
2. Mr. S. G. Sastry, B.A., M.Sc., F.C.S.,
   Director, Sandalwood Oil Factory.
3. Mr. M. K. Narasimhan, B.A.,
   Cement Factory, Bhadravati.

GOVERNMENT OF MYSORE

ELECTRICAL DEPARTMENT

OFFICE OF THE SUPERINTENDENT
POWER AND LIGHTING

D. O. No. 102.

Champion Reefs, (MYSORE, S. INDIA) 13th/14. January 1940

Dear Sir,

MANUFACTURE OF CARBON ELECTRODES.

I wish to acknowledge, with thanks, your letter No.337-50 dated 6th instant, and to inform you that I have written to the Chairman, Mysore Iron & Steel Works, Bhadravati, and Mr. D.V. Krishna Rao in the matter and will fix up a date for a meeting very early. I have personally discussed the matter also with Dr. J.C. Ghosh, Director of Indian Institute of Science, and Professor K. Aston of the Department of Electro Technology of the same institute, and they expressed their willingness to cooperate with us.

I understand that priliminary experiments have been started at Bhadravati and further reports will be submitted in due course Dr. Ghosh and Professor Aston are also likely to have some investigations carried out in their institute which will be ~~corelat~~ Coordina with the work being done at Bhadravati.

BS Office
Acc'd with thanks
& Kept in Connected file
15-1-40

Yours Sincerely,
Rhasad
14/1/40

To

V. Venkatachar, Esq., M.A., B.Com.,
Secretary, Board of Industries & Commerce,
BANGALORE.

RP/BVS.

Manufacture of Graphite Electrodes etc
M. 210
G.P. 52/40 2f. 234, 242

65 The facts for orders are as under
(1) Continuance of the Sub Committee as a part of the B.S. & R.
(2) Sanction of necessary staff, equipment etc to continue the work at Bhadravati —
64 submitted for perusal. Reply for the telegram may be awaited.

28/4. Dy Secy 28/4/44

65 Ce 29/4/44 29/4

Letter No. G.6618 of 27.4.44 from the G.M.M.D. Co forwarding a copy of the report of Dr. Krishna Rao in the matter.

66 The G.M. has sent a duplicate copy of the note already sent to Dr. Prasad copy of which has been received. He has furnished his remarks re. grant of staff required for the purpose. It has not been the case so far to sanction separate grants for such investigations. The Concern should perhaps be able to finance the further grant & provide the staff & meet the expn. from the budget of the Concern. The investigations having been proceeded to a certain stage, the results being satisfactory, perhaps cannot be allowed to rest & may have to be pursued

Manufacture of Graphite Electrodes

to enable further action being taken in the matter.

59) Dft letter to C.I.C. please TYSW
17/4/44 TOR 18.4.44
Dft & letter submitted

20/4/44

SP BBC/7/21-4-44

Letter No. 335 of 21.4.44 from Dr. B.K. Ramprasad, forwarding a note prepared by the Works Manager of the M. Iron & Steel Co. Graphite electrodes.

Letter No. 335 of 21.4.44 from Dr B.K. Ramprasad, forwarding a copy of the report of the works manager, Metallurgical Dn. M. Iron & Steel Co. on the graphite electrodes

by the letter of Dr. Prasad & note of Mr. D.V. Krishna Rao are for perusal. They desire that the graphite Electrodes Sub Committee may be allowed to continue to function. A note has already been submitted (D.O. No. SP. 199) that the Sub Committee may be treated as the Sub Committee of the Board of Scientific & Industrial Research and the file is before the Minister for D.S. (19.4.44). The staff asked for by the Works Manager Metallurgical Division, M. Iron & Steel Co. will have to be arranged for by the Works & necessary grants also provided for. The Gl. Manager has been asked to send a detailed note & this is awaited

Board gde

No. 373.
16.1.60.

B'lore
15.1.60.

Dear Sir,

I am desired to ack with thanks the receipt of your no. 602 dt 13/14.1.60, re' the action taken by you in connection with the Sub-Committee relating to the manufacture of Carbon Electrodes.

Yrs. faithfully,

Dt. 15.1.60.

18.1.60

Dr. B.K. Ramprasad, M.A. (Hon.), D.Sc., M.I.E. (Ind.),
Supdt., Power and Lighting,
Champion Reefs,
K.G.F.

375-76/Encl:One. 17th January 40.

Dear Sir,

I am directed to invite a kind reference to subject No.9 on the Proceedings of the Meeting of the Industrial Research Bureau Sub-Committee of the Board of Industries and Commerce held on 7-11-1939 (copy enclosed for your ready reference), forming a Sub-Committee to consider and report about the possibilities of manufacturing Carbon Electrodes. A Chemist from your ~~Factories~~ concern has been appointed to work on the Sub-Committee. I shall be obliged if you kindly let me know the name of the Chemist whom you would prefer to work on the Sub-Committee and to kindly issue necessary instructions to him to co-operate with the Sub-Committee.

I shall be obliged for favour of an early reply from you in the matter.

B/c. Yours sincerely,

17.1.40.

1. Dr.J.C. Ghosh, D.Sc.,F.N.I.,
   Director, Indian Institute of
   Science, Hebbal P.O.,
   B A N G A L O R E.

2. M. Venkatanaranappa, Esq., B.A.,
   Chairman of the Board of Directors,
   Mysore Paper Mills, Ltd.,
   B H A D R A V A T I.

THE MYSORE PAPER MILLS LIMITED

TEL. ADD. "PAPERMILL"
HEAD OFFICE: BANGALORE

BHADRAVATI
(MYSORE STATE RY.)

Ref. No. 2065

DATED 22nd January 1940

The Secretary,
Board of Industries & Commerce,
Bangalore.

Dear Sir,

Subject:- Sub Committee for reporting on the manufacture of Electrodes.

With reference to your letter No.375-76 of the 17th instant, desiring to know the name of the chemist whom we would select for working on the above Committee, we suggest the name of Mr. N.K. Seshadri Iyengar, M.Sc., Suprevisor of our Pulp Section, to work on the Committee.

Yours faithfully,
For THE MYSORE PAPER MILLS LTD.,

Ag. General Manager.

INDIAN INSTITUTE OF SCIENCE,

BANGALORE, INDIA.

J. C. GHOSH, D. Sc., F.N.I.,
DIRECTOR.

TELEGRAMS:
"SCIENCE", BANGALORE.
CODE: A.B.C. 5TH EDITION.

D/834

25th January 1940.

The Secretary,

Board of Industries & Commerce,

Bangalore.

Dear Sir,

Kindly refer to your letter No.375-76 dated the 16th January 1940. I nominate Prof.K.Aston, B.Sc.(Tech.), M.Sc., M.I.E.E., Head of the Department of Electrical Technology of this Institute, for appointment as a member of the Sub-Committee dealing with the manufacture of graphite electrodes.

Yours faithfully,

J.C.Ghosh

Director.

334. 31st January 40.

Mr.V. Venkatachar, B.A., B.Com.,
Secretary.
X XXXXXXXXXXXXXXXXXXXX
XXXXX

Dear Sir,

In acknowledging with thanks the receipt of your letter No. D/351 dated the 25th January 1940, nominating Prof. K. Aston, B.Sc.(Tech.), M.Sc., M.I.E.E. Head of the Department of Electrical Technology of your Institute for appointment as a member of the Sub-Committee dealing with the manufacture of graphite electrodes, I am directed to request you to kindly issue necessary instructions to Prof. K. Aston to get into touch with Dr.B.V. Rammohan, B.A.(Hon.), B.Sc., M.I.E.(Ind.), Convenor of the Sub-Committee in taking early further action in the matter.

Yours sincerely,

Dr.J.C. Ghosh, D.Sc., F.I.I.,
Director,
Indian Institute of Science,
Gibbal P.O.,
B A N G A L O R E.

No.395-96.

Copy of the above, is forwarded, with compliments to Prof.K. Aston, B.Sc.(Tech.), M.Sc., M.I.E.E., Head of the Department of Electrical Technology, Indian Institute of Science, Bangalore, for information.

RNS4) Secretary.

G/C. 31.1.40. P.T.O.

No.395-96.

Copy of the foregoing, is forwarde, with compliments to Dr.B.K. Ramprasad, M.A.(Hon.), D.Sc., M.I.E.(Ind.), Superintendent, Power and Lighting, Champion Reefs, Kolar Gold Fields and Convenor of the Sub-Committee dealing with the manufacture of Graphite Electrodes, for information.

Secretary.

G/c
31.1.46.

XXX No.404. 31st January 1940.

V. Venkatachar, Esq., M.A., B.Com.,
x xxxxxxx Secretary. xxxxxxx
xxxxxx

The Ag. General Manager,
Mysore Iron & Steel Works, Paper Mills
B.H.A.D.R.A.V.A.T.I.

Dear Sir,

Subject:- Sub-Committee regarding the Manufacture of Carbon Electrodes.

I write to acknowledge with thanks the receipt of your letter No.2065 dated 22-1-1940 suggesting the name of Mr.M.K. Seshadri Iyengar, M.Sc., Supervisor of the Pulp Section of your Works to work on the Committee. I shall be obliged if you will kindly issue necessary instructions to Mr.Seshadri Iyengar to co-operate with the Sub-Committee and to get into touch with Dr.B.K. Ramprasad, M.A.(Hon.), D.Sc., M.I.E.(Ind.), Superintendent, Power & Lighting, Champion Reefs, Kolar Gold Fields, who is the Convenor of the Sub-Committee.

Yours faithfully,

Sd/- V. Venkatachar,

Secretary.

RIS3)

P.T.O.

No.405. Bangalore, dated, 31-1-1940.

Copy of the foregoing, is forwarded, with compliments, to Dr.B.K. Ramprasad, M.A.(Hon.), D.Sc., M.I.E.(Ind.), Superintendent, Power and Lighting, Champion Reefs, Kolar Gold Fields, and Convenor of the Sub-Committee, for information.

Secretary.

Gfc.
3
31.1.40.

THE MYSORE PAPER MILLS LIMITED

TEL. ADR 'PAPERMILL'
HEAD OFFICE : BANGALORE
REF. NO. 2305

TRADE MARK — BISON BRAND

BHADRAVATI
(MYSORE STATE RY.)

DATED February 3rd 1940

The Secretary,
Board of Industries & Commerce,
Department of Industries & Commerce,
Bangalore.

Dear Sir,

Sub-committee for Electrodes.

We are in receipt of your letter No.404 of the 31st ultimo in regard to the instructions to be conveyed to Mr. N.K. Seshadri Iyengar relative to the work of the Sub-Committee for the manufacture of carbon electrodes. We are taking appropriate action in the matter.

Yours faithfully,
For THE MYSORE PAPER MILLS LTD.,

M R Ramaswamy

Ag. General Manager.

5.2.40

No. 462 Boards/Sk.

8/2/60.

B'lore,
7.2.60.

To

The Dy. General Manager,
Mysore Paper Mills, Ltd.,
Bhadravati.

Sub:- Commitee re: manufacture of Electrodes.

Dear Sir,

I am directed to ack. with thanks the receipt of your letter No. 2305 dt 3.2.1960 stating that you have been taking appropriate action on the above subject.

Yrs. faithfully,

7.2.60
Secy.

Dr. 7.2.60.

8/2/60

8/2/60

Immediate

No. 562 Bd. of Ste.

B'lore,
4. 5.3.40.

Dear Dr. Ramprasad,

I wish to invite a kind reference to this office letter no. 337-50 of 6.1.1940, and to request you to be so good as to kindly let me know if the Sub-Committees appointed to consider (1) "The Manufacture of Glauber Salt" and (2) "The Manufacture of Carbon Electrodes," had met at any time and if so to kindly arrange to send me, at an early date the proceedings of the meetings for being placed before the Board at its meeting fixed to be held on the 16th inst.

T.S. 6.3.40 613

Thanking you,

Yours sincerely,

Dr. M 5.3.40.

W 6.3.40

Dr. B. K. Ramprasad, M.A.(Hons.), D.Sc., M.I.E. (Ind.)
Supdt., Power & Lighting,
Champion reefs, (K.G.F.)

DR. B. H. RAM PRASAD,
M.A. (HON.), D.Sc., M.I.E., (IND.),
SUPERINTENDENT.

OFFICE OF THE SUPERINTENDENT
POWER AND LIGHTING,
CHAMPION REEFS,
(K.G.F.)

D. O. No. 143

8th March 1940

Dear Sir,

BOARD OF INDUSTRIES & COMMERCE.
1). Manufacture of Glauber's Salt.
2). -do- Graphite Electrodes.

I wish to acknowledge with thanks your D.O.No.562 dated 6th instant and to inform you as follows:-

1). Manufacture of Glauber's Salt - Since writing to you in my D.O.No.103 of 14-1-40 about my discussions with Dr. K.R. Krishnaswamy of the Indian Institute of Science, we have met twice at Bangalore and K.G.F. and considered possibilities of obtaining Glauber's Salt as a by-product from the process of the production of Sodium Bichromate. We are also considering other economical methods of production and I shall meet Dr. K.R. Krishnaswamy again tomorrow and send my further report.

2). Manufacture of Graphite Electrodes:- After receipt of your D.O.No.395-36 of 31-1-40, I personally discussed with Prof. K. Aston of the Indian Institute of Science and Mr. M. Venkatanaranappa, Chairman, Mysore Iron & Steel Works, Ltd., and wish to report that the investigations have been started at the Indian Institute of Science and at Bhadravati. The Members of the Committee feel that further report may be sent only after the first stage of the investigations (i.e. after a set of Electrodes have been prepared in the Electric Furnace).

Mr. M. Venkatanaranappa considers it desirable to hold the Meeting of the Sub-Committee at Bhadravati after the 15th instant. I shall submit a report of our proceedings thereafter.

Yours Sincerely,
K Prasad

To
V. Venkatachar, Esq., M.A., B.Com.,
Secretary,
Board of Industries & Commerce,
BANGALORE.

8/3/40

RP/BVS.

BD Office
W
9.3.40

Issued

684

23rd April / 40.

V.Venkatachar Esq.,M.A.,B.Com.
XXXXXXXXXXXXXXXXXXXXXXXX Secretary.
XXXXXXX

Dear Mr.Ram Prasad,

With reference to your personal request regarding the rates of T.A. allowed to non-official members of the sub-committee, I note below the usual rates of T.A. allowed under the regulations for your reference.

1) Railway Fare: Single first class to and fro.
Single third class (if a servant is taken)

2) Road Mileage: 4 annas per mile.

3) Daily allowance: Rs.5/- per day.

A non-official member who is entitled to railway fare higher than the third class, will record in his T.A.bill, a certificate of having travelled in the class for which railway fare is claimed therein. Otherwise he will be paid only railway fare based on the fare of the class in which he actually travelled.

The T.A. Bill may be prepared by the concerned non-official member and be forwarded direct to the Comptroller

P.T.O.

Comptroller to the Government together with a certificate of attendance at the meeting given by the Secretary of the Board.

Yours sincerely,

Dr.B.K. Ram Prasad
M.A.(Hon) D.Sc., M.I.E.(Ind).
Convenor, Manufacture of Carbon
Electrodes Sub-Committee,
Superintendent, Power & Light,
Champion Reefs, (K.G.F.)

SGR-2)

D. I C.

Case No.....of 193

NOTE.

BOARD OF INDUSTRIES AND COMMERCE.

Subject:— Manufacture of Graphite Electrodes.-- Sub-Committee.

No. 696 one file with Papers

Sent on 25/4/40.

Submitted.

Letter No.175 dated 23rd April 1940 from Dr.B.K.Ram Prasad, Superintendent, Power and Light, who is the convenor of the above Sub-Committee, forwarding the Proceedings of the Sub-Committee which met at Bhadravati on the 15th April 1940, is herewith submitted for ~~favour of~~ kind perusal and orders.

Dated,25th April 1940

Secretary.

Director) Absent from Hqrs.

Chairman)

HSR)25-4-40

WD0820—GPB—12,000—9-9-38

694

25th April 1940

Mr. V. Venkatachar, M.A., B.Com.,
xxxxxxxxxxxxxxxxxxxxxx

Dear Mr. Ram prasad,

Subject: Manufacture of Graphite Electrodes.

I acknowledge with thanks the receipt of your letter No. 175 dated 23rd April 1940 together with enclosures sent therewith. The minutes of the meeting together with the notes are being submitted to the Chairman of the Board of Industries and Commerce for kind perusal and orders.

Yours sincerely,

Dr. B.K. Ram Prasad, M.A., (Hon)
D.Sc., M.I.E., (Ind)
Superintendent, Power and Light,
Champion Reefs, (K.G.F.)

HSR)25-4-40

701
Nine Pages in original 22/4

27th-4-42

Confidential.

The Publicity Officer to the Government
of Mysore, Public Offices, Bangalore.

Subject: Manufacture of Graphite Electrodes.

I am desired by the Chairman of the Board of Industries and Commerce to forward herewith in original the letter together with the Proceedings of the above Sub-Committee received from Dr.B.K. Ram Prasad, to enable you to make some use of the information (omitting technical details). The Proceedings are to be treated as Confidential.

I shall be obliged if the original enclosures are returned to me very early.

The receipt of the letter may kindly be acknowledged.

I have the honor to be,
Sir,
Your most obedient servant,

SECRETARY.

D. I C. *Case No.....of 193*

NOTE.

BOARD OF INDUSTRIES AND COMMERCE.

Subject:— Manufacture of Graphite Electrodes - Sub-Committee.

No. 696/ Encl one file.

OFFICE OF THE
FIRST MEMBER OF COUNCIL
APR 25 1940
No 9900

Submitted.

Letter No.175 dated 23rd April 1940 from Dr.B.K. Ram Prasad, Superintendent, Power and Light, Champion Reefs, who is the convenor of the above Sub-Committee forwarding the Proceedings of the Sub Committee which met at Bhadravati on the 15th April 1940, is herewith submitted for kind perusal.

Secretary.

Dated, 25th April 1940

Director) Absent Gupta.

Chairman) Please send this to the Publicity officer who may make some use of this information (omitting technical details).

26/4/40

further Boring up W 26/4/40.

Draft Letter put up as per visit

27/4/40

WD0820—GPB—12,000—9-9-38

2158/40

TELEPHONE: 2277

TELEGRAMS: "PUBLIC"

MR RANGA IYER,
Publicity Officer to Government.

GENERAL AND REVENUE SECRETARIAT,

Dated, Bangalore, 29th April 1940.

To

The Secretary,
Board of Industries and Commerce,
Bangalore.

Sir,

Manufacture of Graphite Electrodes.

I have the honour to acknowledge, with thanks, the receipt of your confidential letter No.701 dated 27th April 1940 together with the copy of the Proceedings of the Sub-Committee referred to. I shall as desired by you, be returning the original enclosures when I have done with them.

I have the honour to be,
Sir,
Your most obedient servant.

Publicity Officer to Government.

10/40-1.8 11.7.40 27/4
Reminder.
11/7/40

Immediate — B.S. & He — Immediate

No. 10/CO.-1

The Publicity Officer to Govt — Issued
of Mysore Bangalore —

Sir,

I am directed to invite a /cid reference to Your letter No. 21581P.O. dated 29th April '40 acknowledging receipt of the Standing Order Graphite Electrode - The original endorsement forwarded to You have not been returned to this office so far. You are requested to return the endorsement immediately, as the same is urgently required

11/7/40

Secretary I

11/7/40

DR. B. K. RAM PRASAD,
M.A. (HON.), D.SC., M.I.E., (IND.),
SUPERINTENDENT.

D. O. No. 175/Minutes & Notes.

OFFICE OF THE SUPERINTENDENT
POWER AND LIGHTING,
CHAMPION REEFS, (K.G.F.)

23rd. April, 19 40

Dear Sir,

MANUFACTURE OF GRAPHITE ELECTRODES.
(Industrial Research Bureau)

With reference to my personal conversation with you on the 19th instt., I wish to inform you, as follows:-

A Meeting of the Sub-Committee was convened at Bhadravati on Monday the 15th instt. and the investigations carried out at the Mysore Iron and Steel Works were reviewed (vide. Minutes separately sent). The production of electrodes from natural graphite was undertaken to meet the immediate requirements of the Mysore Paper Mills and proved successful. The conductivity, mechanical strength and cost were found to be approximately the same as that of the original electrodes.

Investigations are being continued, for producing artificial graphite electrodes from petroleum coke and cocoanut shell charcoal. The method of heating the electrodes in the Electric Furnace is being modified and the current density adjusted to give the required temperature. A further report will be submitted in about a month's time.

The Chairman of the Mysore Iron & Steel Works and the Chief Electrical Engineer, and the General Managers of the Mysore Iron & Steel Works and Paper Mills, were pleased to meet the Members of the Sub-Committee and offered valuable suggestions.

Yours Sincerely,
R. Prasad

To
V. Venkatachar, Esq., M.A., B.Com.,
Secretary, Board of Industries & Commerce,
BANGALORE.

23/4/40

RP/BVS.

Acknowledged 25/4/40

submitted for kind perusal

Secretary

Chairman

MINUTES OF THE MEETING OF THE SUB-COMMITTEE ON THE MANUFACTURE OF GRAPHITE ELECTRODES HELD ON MONDAY THE 15TH APRIL 1940, AT BHADRAVATI.

* * *

Present:- Mr. N. R. Jungarkar, B.E. Indian Inst. of science

" D. V. Krishna Rao, B.A., Mysore Iron and Steel Works, Bhadravati.

" N. K. Seshadri Iyengar, B.A., M.Sc., Mysore Paper Mills, Bhadravati.

Dr. Ram Prasad, M.A. (Hons.)., D.Sc., Superintendent, Power & Lighting, K.G.F. (Convener)

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From the Minutes of the proceedings of the Industrial Research Bureau Sub-Committee of the Board of Industries and Commerce, held on 7th November 1939, re: the manufacture of Carbon Electrodes, it is seen that some experiments were conducted at the Mysore Iron and Steel Works with Magnesite and the results were not satisfactory. Later on, it was found advisible to work with some form of carbon or natural graphite to meet the immediate emergency of the Mysore Paper Mills; and a start was made with natural graphite. Details of the investigations carried out are described in the note prepared by Mr. D.V. Krishna Rao (copy enclosed).

(Natural Ceylon Graphite, which was available in stock, was cleaned, pulverised and pressed in a special apparatus constructed by the Iron and Steel Works and the electrodes were baked in an Electrical Furnace. The bigger size of electrodes were however baked in a coal fired furnace. The materials obtained were satisfactory to meet the immediate emergencies.) Large scale investigations are now being carried out with Petroleum Coke and cocoanut shell charcoal.

The report of the work done by Mr. D.V. Krishna Rao was examined by the Committee and it was agreed that the investigations should be carried out for another 4 to 6 weeks be-

before sending a further report.

The cost of the natural graphite electrodes were reported to be favourable compared with the original electrodes purchased by the Paper Mills and the Electrical and Mechanical qualities were also satisfactory.

As the Alkali Chlorine Plant had to be brought to full working condition, it was recommended that electrodes from natural graphite may be continued to be prepared until the required quantity is supplied i.e. the work to be continued for another 10 to 12 weeks.

In the meantime, if the Petroleum Coke Electrodes proved satisfactory, a bigger furnace of 100 K.W. would be constructed.

The present investigations were carried out with a graphite core in the electric furnace, but it was recommended to eliminate the core and load the furnace with the electrodes in a direction at right angles to the direction of the current.

Mr. Junnarker from the Indian Institute of Science suggested that duplication of work at the Institute and the Iron Works may be avoided, if the 2 agencies correlate their work and supplement the facilities available in each place. The Institute Authorities could decide about further work to be conducted thereafter they are acquainted with the results already obtained at Bhadravati.

The Members of the Committee personally inspected the various apparatus used for investigations, such as, the high pressure press, the ball mill, the screening apparatus, baking ovens and the electric furnace. They also visited the Paper Mills, where electrodes prepared from natural graphite ~~in the electrolytic cells~~ were being successfully used in the Electrolytic cells. The General Manager of the Paper Mills expressed

his appreciation of the immediate relief given to them by the supply of natural graphite electrodes, at the critical time.

The Chairman, Mysore Iron & Steel Works and the Chief Electrical Engineer were pleased to meet the Members of the Sub-Committee and offered valuable suggestions.

Large scale investigations are being continued and it is hoped that Graphite Electrodes would be successfully produced from Petroleum Coke and cocoanut shell charcoal at a reasonable cost.

* * *

R Prasad
23/4/49

A NOTE ON THE EXPERIMENTS CONDUCTED IN CONNECTION WITH THE MANUFACTURE OF ELECTRODES. (by Mr D V Krishna Rao)

The question of conducting experiments for manufacturing in a small scale carbon and graphite electrodes ~~required~~ for electro-thermal and electric chemical work assumed considerable importance after the declaration of war in September last. So far no work has been done in this direction in India except at Benares Hindu University where a few small trials have been conducted. As the need for the graphite electrodes for the Electrolyser Plant at the Mysore Paper Mills was urgent, it was decided to commence investigations immediately.

For want of sufficient data of a practical nature, the procedure indicated in text-books was followed. The main items of work which had to be tackled are:-

1). Suitable raw materials - "body material".
2). Binding material.
3). Grinding and mixing.
4). Moulding and pressing.
5). Baking.
and 6). Graphitisation.

1. The most suitable raw material for the manufacture of electrodes is a carbonaceous material containing minimum percentage of ash and volatile matter. In American practice, the material commonly used is petroleum coke product, which is a derivative of petroleum distillation. Other materials that could be used are anthracite, retort carbon, pitch coke, wood charcoal and graphite. Of these it was considered desirable to select some local material of required purity. For this purpose, one or two kinds of charcoal - Dindiga and Yettiga were considered, but they were found to contain large percentages of ash. It was therefore decided to conduct experiments on charcoal made from cocoanut shell, ~~representative analysis of which is given below:-~~

Moisture.	...	4.00%
Volatile matter.	...	12.50%
Ash.	...	2.30%
Fixed carbon.	...	81.20%

The ash content is still too high for Electrodes to be for Electro-chemical work.

It was also decided to make investigation with petroleum coke side by side.

The progress of investigation with these two materials was very slow and the condition of Electrolyser Plant at the Paper Mills required immediate replacement of graphite electrodes. It was therefore decided to make a few sets out of some good variety of natural graphite. Various qualities of natural graphite were tried. The enclosed Statement gives particulars of the analyses and the electrical specific resistance of electrodes made from them.

2. Binding material:- From the beginning of our investigation coal tar pitch is being used as the binder. We have had no difficulty with this material. Only we had to change the percentage of pitch to be added according to quality of the carbonaceous material.

3. Grinding and Mixing:- Grinding is done in either an open pan mortar mill, small ball mill or grinding mill according to convenience. Mixing graphite with pitch is done in a small grinding machine, the materials having been warmed before. Mixing, which is considered to be the most important item in the manufacture of electrodes, is not satisfactory and more efficient methods are under consideration.

4. Moulding and pressing:- According to the standard practice, there are two kinds of pressing electrodes, one by means of moulding and the other by what is known as extrusion. The latter process is suitable for manufacture on a large scale and is possible only where huge extrusion presses are available The former process, namely, moulding, being the simpler of the two has been adopted here. For this work one of the screw presses which was used in the Brick Plant for pressing different shapes of fire-clay products was used. The dies for the two kinds of electrodes now made were cast in our Foundry and the press is operated by manual labour. The dies are are also warmed before pressing. There is no provision for noting the pressure, but, it is believed that in most of the

cases the pressure is sufficient.

4. Baking:- This gave us a good deal of trouble in the early stages. The electrodes that were pressed in the beginning were cylindrical rods 2" in dia.x 12" in length. These had to be heated out of contact with air very gradually up to a temperature of about 1,100°C. For this purpose a small electrical resistance furnace was used, but proper non-oxidising atmosphere could not be ensured. After a few failures, 3 rods at a time were kept in an old broken crucible of required size and the surrounding places filled with charcoal powder; and the whole thing kept in the electric furnace which was sealed properly. This method gave fairly satisfactory results. But the other size of electrode, which is a regular slab 31" x 4" x 2", could not possibly be baked in the small furnace. The big 1/2 ton electric furnace was utilised for this purpose, but the heating was too rapid and most of the slabs used to crack. Ultimately it was decided to use the coal fired furnace which was constructed for annealing steel castings. A batch of slabs and rods is kept in large C.I.Boxes which are lined with thin fire bricks; the top is covered by a steel plate, and the whole thing is nicely sealed. At the bottom of the box a few holes are provided for the escape of the gas. The whole box, 2 or 3 as the case may be is kept inside the furnace and the coal firing started. Firing is done very gradually. Normally 2 boxes containing about 32 slabs and 32 rods take about 40 to 48 hours. The results are fairly satisfactory and it is only after this method of baking was found successful when we have been able to supply a number of sets of electrodes to the Paper Mills. It is understood that so far these are giving satisfactory service.

After the electrodes are baked satisfactorily they are taken out, threaded according to requirement, and then suitably impregnated with double boiled linseed oil.

5. Graphitisation:- Along with the supply of electrodes made from natural graphite to Paper Mills, the question of utilising local carbonaceous materials and graphitising them is steadily

being pursued. Although about half a dozen trials have been made for graphitising the electrodes made from petroleum coke and cocoanut shell charcoal, the results are far from satisfactory. A brief account of the work done so far is given below:-

A small furnace, the inside dimensions of which are - 36" x 15" x 18" is built out of good refractory materials. The inside lining is of magnesite bricks and the outside is of first class fire bricks. The sides of the furnace are held suitably by anchoring rods. The bottom of the furnace consists of about 6" of broken fire brick pieces in order to remove the volatile matter from the Electrodes to be graphitised. The electrical connections are made at the two ends of the furnace. For this purpose six graphite electrode rods are used on either side. At the furnace ends of these electrodes is a small slot to take the central cores. The other ends of these electrodes are clamped with copper clamps and then connected together. The two ends of the furnace are connected on to the two terminals from the bank of transformers. The main current supplied to the transformers (3 in number, each 15 KVA.) is from a 50 KVA. transformer 25 Cycles, the secondary of which is a 220 Volts. These 15 KVA. transformers are connected in parallel, by means of a switch, provision has been made for changing the secondary voltages. The tappings are 55, 45, and 30 or 45, 30 and 15 Volts.

As stated above, the trials so far conducted have not proved satisfactory, the main trouble being ~~that we have not been able~~ to attain the very high temperature which is required for graphitisation. Only during one run, which was continued for six days, a fairly high temperature was obtained, judging from the temperature of the outside bricks. The resulting electrode which was completely cracked showed indications of having been partially graphitised. Further attemps are being made to attain the temperature required. At the same time the question of grinding and mixing different proportions of ingredients of dif-

different degrees of fineness is being actively investigated, so as to avoid the large number of cracks that are appearing after they are baked.)

BHADRAVATI.
15th April 1940.

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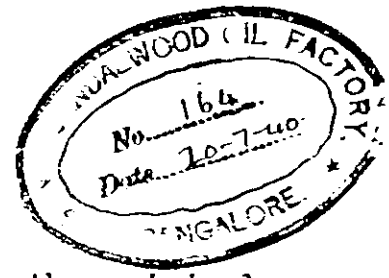
BOARD OF INDUSTRIES & COMMERCE.

D. O. 23/40-1 Encls: 10 fgs. with enclosures

Bangalore, dated 19th July 194 0

V. VENKATACHAR, Esq., M.A., B.Com.,
Secretary.



Dear Sir,

I send enclosed herewith the original enclosures relating to the manufacture of Graphite Electrodes, together with the note on the subject issued by the Publicity Officer, which was received just to day, for your file.

Yours sincerely,

K.Parthasarathi,Esq.,B.A.,
Director, Sandal Oil Factory,
and Secretary, Central Industrial
Research Board, Mysore.

HSR)

Board file

(With the compliments of the Publicity Officer to the Govt. of Mysore)
No. P. 206/39-40) MYSORE INDUSTRIES AND WAR
10th May 1940.)

MANUFACTURE OF GRAPHITE ELECTRODES

The Mysore Paper Mills require graphite electrodes for electro-thermal and electric chemical work.

After the outbreak of war, the question of their continued supply assumed importance. So far no work has been done in this direction in India except at Benares Hindu University where a few small trials have been conducted. As the need for the graphite electrodes for the Electrolyser Plant at the Mysore Paper Mills was urgent, it was decided to commence investigations immediately.

The scientists attached to the Mysore Iron and Steel Works, Mysore Paper Mills and the Superintendent, Power and Lighting, Kolar Gold Field, all put their heads together.

The most suitable raw material for the manufacture of electrodes is a carbonaceous material containing minimum percentage of ash and volatile matter. In American practice, the material commonly used is petroleum coke product, which is a derivative of petroleum distillation. Other materials that could be used are anthracite, retort carbon, pitch coke, wood charcoal and graphite.

Of these it was considered desirable to select some local material of required purity. For this purpose, one or two kinds of charcoal -- Dindiga and Yettiga -- were considered, but they were found to contain large percentages of ash. It was therefore decided to conduct experiments on charcoal made from coconut shell.

It was also decided to make investigation with petroleum coke side by side. The progress of investigation with these two materials was very slow and the condition of Electrolyser Plant at the Paper Mills required immediate replacement of graphite electrodes. It was therefore decided to make a few sets out of some good variety of natural graphite.

Natural Ceylon Graphite, which was available in stock, was cleaned, pulverised and pressed in a special apparatus constructed by the Iron and Steel Works and the electrodes were baked in an Electrical Furnace. The bigger size of electrodes were however baked in a coal fired furnace. The materials obtained were satisfactory to meet the immediate emergencies.

The cost of the natural graphite electrodes were reported to be favourable compared with the original electrodes purchased by the Paper Mills. The Electrical and Mechanical qualities were also satisfactory. As the Alkali Chlorine Plant had to be brought to full working condition, it was recommended that electrodes from natural graphite may be continued to be prepared until the required quantity is supplied.

Along with the supply of electrodes made from natural graphite to Paper Mills, the question of utilising local carbonaceous materials and graphitising them is steadily being pursued. Although about half a dozen trials have been made for graphitising the electrodes made from petroleum coke and coconut shell charcoal, the results have not proved satisfactory, the main trouble being the inability to attain the very high temperature which is required for graphitisation. Only during one run, which was continued for six days, a fairly high temperature was obtained, judging from the temperature of the outside bricks. The resulting electrode which was completely cracked showed indications of having been partially graphitised. Further attempts are being made to attain the temperature required. At the same time, the question of grinding and mixing different proportions of ingredients of different degrees of fineness is being actively investigated, so as to avoid the large number of cracks that are appearing after they are baked.

DR. B. K. RAM PRASAD,
M.A. (HON.), D.Sc., M.I.E., (IND.),
SUPERINTENDENT.

GOVT. SANDALWOOD OIL FACTORY
No. 284
Date 30.7.40
BANGALORE.

OFFICE OF THE SUPERINTENDENT
POWER AND LIGHTING.

D. O. No. 29.

CHAMPION REEFS, 29th July 1940
(K.G.F.)

Dear Sir,

(Graphite Electrodes)

With reference to your letter No.31/40-41 dated 22nd. July 1940, I wish to inform you that further experiments are being carried out at the Mysore Iron & Steel Works, Bhadravati and attempts are being made to build a bigger furnace and improve the process of moulding the electrodes.

I shall submit further details after the next meeting of the Sub-Committee.

Yours Sincerely,

R Prasad
29/7/40

To

The Secretary, Industrial Research Sub-Committee,
Central Industrial Research Board,
Govt. Sandal Oil Factory,
MYSORE.

RP/BVS.

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CONFIDENTIAL.

INDUSTRIAL RESEARCH BOARD.

Proceedings of the First Meeting of the newly constituted Industrial Research Board Sub-Committee held on Tuesday the 3rd September 1940, at 1 P.M. at the Chambers of the First Member of Council.

PRESENT.

Rajamantrapravina N. Madhava Rau, Esq., B.A., B.L.,
First Member of Council (*Chairman*).

Members.

1. Mr. M. Venkatanaranappa, B.A.,
Chairman, Mysore Iron and Steel Works, etc.,
Bhadravati.
2. Mr. B. G. Appadorai Mudaliar, B.A., B.Sc., A.M.I., M.E.,
Director of Industries and Commerce in Mysore,
Bangalore.
3. Mr. K. Parthasarathi, B.A.,
Ag. Director, Sandalwood Oil Factory,
Mysore.
4. Mr. E. V. Ganapathi Iyer, B.Sc.,
Government Director, Industrial Concerns,
Bangalore.

Mr. K. Parthasarathi, B.A.,
Ag. Director, Sandalwood Oil Factory,
Mysore (*Secretary*).

Mr. C. E. Noronha, M.A., Secretary to Government, Development Department, Dr. K. R. Krishnaswami, B.A., D.Sc. (Lond.), F.I.C., Indian Institute of Science, and Mr. B. Rama Rao, M.A., D.I.C., Director of Geology, were also present by request.

GENERAL.

Opening the proceedings of the regular meeting, the Chairman referred to the agenda circulated to the members and said that the review of work done by the several sub-committees constituted by the Research Bureau Sub-Committee on 7th November 1939 may be taken up for consideration.

(1) *Manufacture of Super-phosphates.*—The progress of work done by this Committee was read out.

Present Personnel.

1. Dr. J. C. Ghosh, D.Sc., F.N.I.,
Director, Indian Institute of Science (*Convenor*).
2. Mr. S. G. Sastry, B.A., M.Sc. (Lond.), F.C.S.,
Director, Sandalwood Oil Factory.
3. Dr. K. R. Krishnaswamy, B.A., D.Sc. (Lond.), F.I.C.,
Indian Institute of Science.
4. Mr. E. V. Ganapathi Iyer, B.Sc.,
Government Director, Industrial Concerns (new member from 4th September 1940).

Dr. Krishnaswamy explained the details of the experiments conducted by him in respect of phosphatic nodules of Trichinopoly. The suggestion of the Committee to depute an officer of the Geological Department was also considered. The Chairman observed whether it was necessary to depute an officer, when other raw materials are locally available for the manufacture of super-phosphates.

Mr. E. V. Ganapathi Iyer stated that Messrs. Parry & Co., Madras, are manufacturing super-phosphates out of bones collected from various parts of South India and making large profits. He said that some experiments are being conducted in the Mysore Chemicals and Fertilisers, Ltd., Belagula, and he would be suggesting independently to Government to start a fertiliser industry. The Chairman remarked that the very idea of starting the Mysore Chemicals and Fertilisers, Limited, was to develop a fertiliser industry in the State and there was no necessity to have a separate factory to manufacture fertilisers. Dr. Krishnaswamy explained to the house that the manufacture of super-phosphates from bones is a simple proposition and could be advantageously pursued.

The Chairman desired to know if statistical information with regard to the availability of bones in the State could be had from the Market Survey reports of the Department of Industries and Commerce. The Director of Industries and Commerce stated that plenty of bones were available in the State, particularly in the Malnad area, and promised to furnish complete information to the Board at its next meeting.

It was resolved that the sub-committee should investigate the position as regards raw materials, the availability of market, equipment necessary with working costs, etc.

The Chairman suggested that Mr. E. V. Ganapathi Iyer, Government Director, Industrial Concerns, may also serve as a member on this sub-committee.

(2) *Manufacture of Hydrated Lime.*—

Present Personnel.

1. Mr. B. Rama Rao, M.A., D.I.C.,
   Director of Geology (*Convenor*).
2. Dr. H. S. Sharma, Ph.D. (Lond.), D.I.C. (Lond.),
   Chemist, The Mysore Paper Mills, Ltd.,
   Bhadravati.
3. Mr. Balakrishna, B.A.,
   Mysore Iron and Steel Works,
   Bhadravati.
4. Mr. G. Gundu Rao, M.Sc., A.I.I.Sc.,
   The Mysore Sugar Co., Ltd., Mandya.

The Chairman remarked that further experiments should be continued at Bhadravati and also at the Porcelain Factory, and this subject may be omitted from the list.

(3) *Manufacture of Ferro-Manganese, Ferro-Silicon, etc.*—The Chairman, Mysore Iron and Steel Works, explained that the scheme for the installation of 1·500 K. V. A., electric furnace for the manufacture of Ferro-alloys had since been sanctioned by Government and that further work was in progress. Since this question had reached a stage when no further advice was necessary, the Chairman observed that further consideration of this subject might be dropped.

(4) *Magnesite Bricks.*—The Chairman, Mysore Iron and Steel Works, stated that the Indian raw material was stated to be unsuitable for the manufacture of magnesite bricks and that the Works, at present, imported these bricks from Japan, and they were giving satisfactory results. Dr. Krishnaswamy stated that as the Indian material being far too pure, the results may not be satisfactory and suggested that further expriments might be conducted at the Porcelain Factory, when the tunnel kiln was ready.

(5) *Grinding Bodies for the Cement Plant.*—The Chairman, Mysore Iron and Steel Works, explained in detail the experiments conducted at the Works.

The Committee opined that it would not be possible to manufacture these at economical rates.

It was resolved to delete this subject.

(6) *Manufacture of Caustic Soda.*—

Present Personnel.

1. Mr. E. V. Ganapathi Iyer, B.Sc.,
   Government Director, Industrial Concerns (*Convenor*).
2. Mr. S. G. Sastry, B.A., M.Sc., (Lond),
   Director, Sandalwood Oil Factory.
3. Mr. B. K. Ramprasad, M.A. (Hon.), D.Sc., M.I.E. (Ind.),
   Government Electrical Department.
4. Dr. K. R. Krishnaswamy, B.A., D.Sc. (Lond.), F.I.C.,
   Indian Institute of Science.
5. Mr. B. Rama Rao, M.A., D.I.C.,
   Director of Geology (new member from 4th September 1940).

The Government Director, Industrial Concerns, pointed out that the Sub-Committe had already sent its recommendation to manufacture this chemical.

The Director of Sandalwood Oil Factory read out the recommendation referred to by the Government Director, Industrial Concerns. The Government Director, Industrial Concerns, explained the implications involved and stated that as there were no manufacturers in South India and as there was a ready market, the chemicals could be readily sold.

There was a general discussion about the Lime-stone deposits in which the Director of Geology and Dr. Krishnaswamy actively participated. It was pointed out that the demand for soda-ash and also chlorine obtained as a bye-product in the manufacture of Caustic-soda and the possibilities of utilising chlorine in the manufacture of super-bleach and bleaching powder should be examined.

It was resolved that the Sub-Committee be requested to carefully re-examine the visible market for the chemicals and other bye-products, plant and equipment required, with capital and running costs involved, etc., and to favour the Board with a comprehensive report.

The Chairman said that Mr. B. Rama Rao, Director of Geology, might also serve on this Committee.

(7) *Manufature of Glauber Salt.*—The quantity of Glauber Salt available as a bye-product in the manufacture of Sodium-bichromate being very small, it was decided that the question might be dropped from further consideration. It was, however, considered that the manufacture of Sodium Sulphite should be kept in view in connection with the scheme for the manufacture of Acetic-acid.

(8) *Manufacture of Alum.*—

Present Personnel.

1. Mr. B. Rama Rao, M.A., D.I.C.,
   Director of Geology (*Convenor*).
2. The Director of Public Health.
3. Mr. S. G. Sastry, B.A. M.Sc. (Lond.),
   Director of Sandalwood Oil Factory.
4. Dr. B. K. Ramprasad, M.A. (Hons.), D.Sc., M.I.E. (Ind.),
   Government Electrical Department.
5. Mr. N. K. Seshadri Iyengar, B.A. M.Sc.,
   The Mysore Paper Mills, Ltd.

In view of the fact that the Mysore Chemical Manufactures, Ltd., had interested themselves in the manufacture of alum, and as, so far as the Board were

aware, no special problems were involved, it was decided that this subject might be deleted from the list.

(9) *Manufacture of Carbon Electrodes.*--

1. Dr. B. K. Ramprasad, M.A. (Hons.), D.Sc., M.I.E. (Ind.) (*Convenor*).
2. Mr. D. V. Krishna Rao, B.A.,
   Mysore Iron and Steel Works.
3. One Chemist from the Mysore Paper Mills, Ltd., and
4. One from the Indian Institute of Science.

The progress of work done by this Committee was noted with satisfaction. Dr. Krishnaswamy said that at the Indian Institute of Science, experiments were being conducted at the instance of Government of India. The Chairman, Mysore Iron and Steel Works, pointed out that the experiments were being continued in the Iron Works as well.

It was resolved to request the Sub-Committee to get the results of experiments and to go into further details and to furnish a report to the Board as early as possible.

(10) *Manufacture of Soaps required by the Textile Mills.*—The Government Director, Industrial Concerns, explained that textile soap of good quality was being manufactured and supplied by the Government Soap Factory. It was decided to delete this subject.

(11) *Manufacture of Plastics.*—

Present Personnel.

1. Mr. V. Paul,
   Indian Institute of Science.
2. Mr. Ahmedali,
   Chemist, Indian Institute of Science.
3. Mr. M. Srinivasaiya, B.A., F.I.I.Sc.,
   Indian Institute of Science.
4. Mr. V. Rama Rao, B.Sc.,
   Government Electric Factory.

After reviewing the work of the Committee, the Chairman pointed out that the Government of India was also interested in this proposition. The Chairman, Iron and Steel Works, suggested that as the Pilot Plant is being erected at Bhadravati, he could try to manufacture formaldehyde there.

The Chairman showed to the Members two sets of samples of Bakelite product—one set made out of local powder prepared at Bhadravati, and the other with imported powder. The samples from the local powder were found to be as good as those from the imported one.

Dr. Krishnaswamy said that Dr. J. C. Ghosh, Director, Indian Institute of Science, had full information about Bakelite powder and plastics in general.

It was decided that the Sub-Committee should be requested to pursue the investigation further and also to consider the commercial aspect of the proposition.

(12) *Manufacture of Copper-wire, Galvanised Pins, etc.*—Since regular work had commenced at the Electric Factory, it was decided to delete the subject.

(13) *Manufacture of Tube Glass.*—The Chairman observed that this subject might be deleted as it was receiving the attention of Messrs. The Mysore Glass and Enamel Works, who anticipated no serious technical difficulties.

(14) *Manufacture of Chemicals, Drugs and Essential Oils.*—

Present Personnel.

1. *Sastravaidyapravina* Dr. S. Subba Rao, B.A., M.B.C.M., L.R.C.P. (Lond.), M.R.C.S. (Eng.), D.P.H., Retired Senior Surgeon. (*Convenor.*)
2. Dr. B. T. Narayan, B.A., Ph.D., D.Sc., Bio-Chemist, Department of Agriculture.

3. Mr. B. H. Krishna, M.Sc., A.I.C., Industrial and Testing Laboratory.
4. Dr. B. L. Manjunath, B.A., D.Phil., M.Sc., Professor of Organic Chemistry, Central College, Bangalore.
5. Dr. P. C. Guha, D.Sc. (Cal.), the Indian Institute of Science.
6. Dr. L. S. Doraswami, M.Sc. (Lond.), Ph.D., Economic Botanist.
7. Mr. M. S. Krishna Rao, Superintendent, Government Soap Factory.
8. Dr. M. N. Ramaswamy, M.Sc., D.Sc., Forest Research Chemist, Forest Research Laboratory.
9. Mr. B. Sanjeeva Rao, B.A., M.Sc. (Mad.), F.I.I.Sc., the Indian Institute of Science.

The Government Director, Industrial Concerns, pointed out that due to War, the cost of essential oils had gone up considerably and the imports had fallen off considerably. It was unanimously agreed that for such of the essential oils for the distillation of which raw materials are locally available, immediate steps should be taken to manufacture them after ascertaining the demand and commercial possibilities. The Board was of opinion that the cultivation of important herbs should be pursued. The Chairman pointed out that the cultivation of cinchona was being extended in the Kadur District. The Director, Sandalwood Oil Factory, suggested that geranium might be grown in the premises of the Sandalwood Oil Factory, as the sample oil distilled from the geranium grown experimentally in the Soap Factory compound was very good and better than the imported material and that the plants could be easily grown and there was a potential market in India for the oil at remunerative prices.

The Chairman finally observed that immediate attempts should be made to encourage private persons to grow geranium and the question of distillation taken up by the Sandalwood Oil Factory.

(15) *Manufacture of Cement Asbestos.*—

Present Personnel.

1. The Director of Geology in Mysore (*Convenor*).
2. Mr. S. G. Sastry, B.A., M.Sc. (Lond.), Director of Sandalwood Oil Factory
3. Mr. M. K. Narasimhan, B.A., Cement Factory, Bhadravati.

After reviewing the work done, the Chairman observed that this question might be dropped.

The question of disposing of the stock of asbestos in the Sandalwood Oil Factory, Mysore, was brought up by the Director of Sandalwood Oil Factory.

The Director of Industries and Commerce said that the existing stock (in the Sandalwood Oil Factory, and with the Director of Geology) might be converted into boiler composition—a simple industry—and at a later stage handed over to private enterprise. The Director, Sandal Oil Factory, said that about 50 tons were available in Mysore. The Director of Industries and Commerce promised to furnish very early the local demand for boiler composition.

(16) *Manufacture of Potassium Permanganate.*—The Director of Geology said that the work was in progress and that final report from the chemist on this special work was awaited.

(17) *Manufacture of Abrasive materials such as Corundum Wheels, Sand Paper, etc.*—It was decided to delete this subject.

(18) *Production of Cinchona.*—It was resolved that the report from Dr. M. N. Ramaswamy be placed before the Committee.

(19) *Manufacture of Water-proof fabrics.*—The Chairman observed that this subject might be left to the Textile mills.

(20) *Mixture of Petrol and Power Alcohol.*—This subject was also decided to be deleted.

(21) *Testing of Textile Samples.*—This subject was also decided to be deleted.

(22) *Sulphur.*—The Director of Geology was requested to expedite the work in connection with the location of sulphur in the State.

(23) *Manufacture of Copper-sulphate.*—Since the Mysore Chemical Manufactures, Ltd., have already been manufacturing this chemical in their works at Turbanahalli, it was resolved to delete this subject.

(24) *Manufacture of Sodium-bichromate.*—The Chairman wanted to know the progress with regard to the construction of buildings and the erection of plant.

The Government Director, Industrial Concerns, and Dr. Krishnaswamy explained the position and said that the work was progressing expeditiously.

II. The next subject considered was Dr. A. V. Varadaraja Iyengar's proposition with regard to the utilization of molasses for the production of potassium salts.

The scheme of Dr. Varadaraja Iyengar was examined. Dr. Krishnaswamy suggested that the question of Tartaric-acid manufacture could conveniently be taken up later, after investigating the availability of green tamarind and that in the meantime, the recovery of potash-salts from molasses might be taken up immediately. The Director of Sandalwood Oil Factory read out the discussion he had with Sir M. O. Forster regarding the advisability of taking up this scheme Dr. Krishnaswamy further suggested that a sub-committee might be appointed to go into this subject and advise the Board.

The Chairman desired to know the working costs involved with full details.

It was finally decided to request Dr. Varadaraja Iyengar to furnish details with regard to cost, etc., to handle ten tons of molasses as an experimental measure, in the proposed Pilot plant, to be placed before the Committee at its next meeting.

III. The starting of a Glue Factory was the last proposition discussed. After a preliminary discussion, the Director of Industries and Commerce was requested to complete the necessary inquiries and get complete statistical information for being placed before the House at its next meeting.

It was the opinion of the House that this was a proposition in which the Mysore Tanneries, Ltd., should interest themselves.

The Chairman thanked the members and the meeting terminated.

K. PARTHASARATHI,
Secretary.

N. MADHAVA RAU,
Chairman.

WD 786—GPB—100—21-11-40

CENTRAL INDUSTRIAL RESEARCH BOARD.

---

9. Manufacture of Carbon Electrodes:-

Investigations are being continued and the report received from the Convenor sent to the Publicity Officer (as per orders of Chairman) for making such use as he deems fit.

The Convenor (Dr. Ramprasad) ~~on~~ ~~29.7.40~~ has intimated on 29.7.40 that he would submit further details after the next meeting of this Sub Committee.

It has been decided in the B.D. meeting on 8.9.40 that this Sub Committee should get the results of expts now conducted at the Iron works & at I. I. Science & to go into further details.

If approd, The Convenor will be intimated after decision & report called for.

Orders

Sd/-
12/11/40.

Secy)

Sd. K
13/11

Government of Mysore.
Industrial Research Board.

No. 100/Ch-1

Office of the Secretary,
Mysore Road,
Bangalore, Dated, 28th Novr. 40.

To

Dr. B.K. Ramprasad, M.A., (Hon), D.Sc., M.I.E., (Ind),
Superintendent, Power and Lighting,
Championreefs (K.G.F.)

Dear Sir,

Subject: Manufacture of Carbon Electordes.

I write to inform you that the progress of work done by this sub-committee, was reviewed in the last meeting of this Board and was noted with satisfaction.

It was resolved that the sub-committee should get the results of experiments now conducted at the Indian Institute of Science and in the Mysore Iron and Steel Works and to go into further details and furnish a detailed report to the Board, very early.

I am to request you kindly to take immediate action in this behalf and the Board kept informed of the developments from time to time.

Yours faithfully,

Secretary,
Industrial Research Board.

Telephone No. 135 Central
ENCLO.

IN REPLY REFER TO
No. 4917

Telegraphic Address:
"GOMED"

GOVERNMENT OF MYSORE
ELECTRICAL DEPARTMENT

OFFICE OF THE SUPERINTENDENT,
POWER AND LIGHTING, (K.G.F.)

Championreefs, 4th. December 194 0.
(MYSORE, S. INDIA.)

The Secretary,
Industrial Research Board,
Mysore Road,
B A N G A L O R E.

S i r,

GRAPHITE ELECTRODES.

With reference to your D.C.No.100/40-1 dated 28th November 1940, I have the honour to enclose herewith a copy of letter No.E.T.596/40-41 dated the 2nd instant, from the Professor, Department of Electro-Technology of the Indian Institute of Science, for your kind information.

I have the honour to be,
S i r,
Your most obedient servant,

45/40-1 (1) Ack.
20/12/40. (2) Submit this to Chairman with a note
20/12.

BK Ram Rao

RP/BVS. Superintendent, KGF. 4/12

Letter No.E.T.596/40-41 dated 2nd. December 1940, from Professor K. Aston, B.Sc., Tech. M.Sc., M.I.E.E., Department of Electrical Technology, Indian Institute of Science, Bangalore, to Dr. B.K. Rao Prasad, Superintendent, Power & Lighting, K.G.F. Champion Reefs.

* * *

With reference to your letter D.O.No.45 dated the 30th November 1940 I have to state that the investigations re: choice of various binding and body materials for electrodes as well as suitable temperatures and pressures for moulding, extruding and baking are at present in progress. The investigations are not as yet complete and no definite results are available.

I would also take this opportunity to bring to your notice that these investigations (carried out at this Institute) have recently been incorporated in the Government of India War Research scheme under the control of the Board of Scientific and Industrial Research and that we are under obligations not to publish any results in this connection without prior sanction of the Central Government.

Sd/- K. Aston.

Professor.

"C o p y"

BVS.

BK Rao Prasad

Superintendent, K.G.F.

Telephone No. 135 Central

ENCLO. Cwl

IN REPLY REFER TO No. 6006/65.

Telegraphic Address:

"GOMED"

GOVERNMENT OF MYSORE

ELECTRICAL DEPARTMENT

OFFICE OF THE SUPERINTENDENT,
POWER AND LIGHTING, (K.G.F.)

Championreefs, 20th. December *194* 0.

(MYSORE, S. INDIA.)

The Secretary,
Industrial Research Board,
Government of Mysore,
Mysore Road - BANGALORE.

S i r,

GRAPHITE ELECTRODES.

In continuation of this office letter No.4917 dated 4th instant, I have the honour to enclose herewith an Extract from letter No.2251 dated 17th instt., from Mr. D.V. Krishna Rao, Superintendent, Open-Hearth Furnace, The Mysore Iron & Steel Works, Bhadravati, for your kind information.

49/40-1
21/12/40. 21/12

I have the honour to be,
S i r,
Your most obedient servant,

BK Ram Rao
Superintendent, KGF.

BVS.

Submitted for kind perusal.

Chairman) 21/12

Extract from Letter No.2251 dated 17th December 1940, from D.V. Krishna Rao, Esq., Superintendent, Open-Hearth Furnace, The Mysore Iron & Steel Works, Bhadravati, to Dr. B.K. Ramprasad, Superintendent, Power and Lighting, Championreefs, Kolar Gold Fields.

* * *

I am in receipt of your D.O.letter No.44 of 30th Novr. 1940 and the subsequent reminder No47 dated 14th instant regarding investigations on the manufacture of electrodes, and regret I could not reply earlier.

Since my last report was written, nothing new has been done. Graphitising furnace worked on the same lines as before, more or less with the same result. Only once did the specific resistance of the graphitised electrodes came down to 0.0007 ohm. per cubic inch. This is only slightly higher than the Acheson's figure. Further experiments with the 45 KVA. transformers were stopped, pending the arrival of 100 KVA. transformer which is expected shortly.

Supply to the Paper Mills of rods and slabs made out of high grade natural graphite is being made as before - two sets per month.

xx xx xx xx xx xx

Expecting to hear from you soon.

Sd/- D.V. Krishna Rao
17-12-40.

* * *

B K Ram Prasad

Industrial Research Board.

No. 285/40-41 Bangalore, Dated, 1st Jan. 1941.

From.

K. Parthasarathi, Esq., B.A.,
Secretary, Industrial Research Board,
Bangalore.

To

Dr. B.K. Ram Prasad, D.Sc., etc.,
Superintendent, Power and Light,
Champion-Reefs. (K.G.F.)

Dear Sir,

Refce: Your letter No.4917/4-12-40 and
6465/20-12-40 re: Graphite Electrodes.

I am to request that the Sub-Committee may keep in constant touch with the experiments conducted at the Mysore Iron and Steel Works.

The Sub-Committee may kindly examine further details and forward a report to the Board with regard to the possibilities of putting it up on a commercial scale.

Yours faithfully,

SECRETARY.

No 296/40-1 Encls: One note.

10th January 1

Immediate.

Dr.B.K. Ramprasad,M.A.,(Hon),D.Sc.,M.I.E.,(Ind),
Superintendent, Power and Lighting,
Champion reefs, K.G.F.

Subject: Manufacture of Graphite and Graphite products in the State.

In forwarding herewith in original a brief note on the above subject, prepared by Mr.P.S. Narayana, Consulting Engineer and Geologist, forwarded by Government, I am directed to request you to be so good as to immediately convene a meeting of the Graphite Electrodes Sub-Committee and to place before them the note for consideration.

Since Government desire to have the report in a fortnight's time, I shall be obliged if the views of the Sub-Committee is intimated to me by the 18th instant.

The enclosures may kindly be returned when done with.

I have the honor to be,
Sir,
Your most obedient servant,

Secretary.

DR. B. K. RAM PRASAD,
M.A. (HON.). D.SC., M.I.E., (IND.).
SUPERINTENDENT.

OFFICE OF THE SUPERINTENDENT
POWER AND LIGHTING,
CHAMPION REEFS, (K.G.F)

D. O. No. 59

CHAMPION REEFS, 11th. Jany 19 41

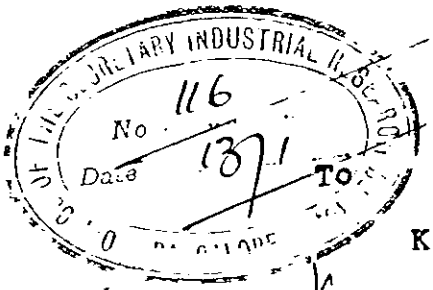
Dear Sir,

Subject:- Manufacture of Graphite and Graphite products in the State.

I beg to acknowledge, with thanks, your letter No.296/40-1 dated 10th instant with the note prepared by Mr. P.S. Narayana, Consulting Engineer & Geologist, and wish to inform you that I have arranged for a Meeting on the 20th instt. at Bangalore, as it is ~~the~~ a convenient date since I have to attend to another Sub-Committee Meeting on the same day, and it will give sufficient time also to the Members at Bhadravathy to attend the Meeting.

I hope this will not inconvenience you.

Yours Sincerely,
Ram Prasad



K. Parthasarathi, Esq., B.A.,
S e c r e t a r y,
Industrial Research Board,
BANGALORE.

13/1/41

DR. B. K. RAM PRASAD,
M.A. (HON.). D.Sc.. M.I.E., (IND.),
SUPERINTENDENT.

OFFICE OF THE SUPERINTENDENT
POWER AND LIGHTING.

D. O. No. 63

CHAMPION REEFS, 16th Jany. 1941.
(K.G.F.)

Dear Sir,

Re: Manufacture of Graphite & Graphite Products in the State.

I am directed to convene a Meeting of the Sub-Committee of Graphite and Graphite Products at 10 A.M. on 20th January 1941 in the Visitor's Room of the Office of the Government Director of Industrial Concerns, United India Buildings, Bangalore, and request you to kindly attend the Meeting.

A G E N D A.

1. Discussion of the Note submitted by Mr.P.J. Narayana regarding Graphite products.

2. Possibilities of the production of artificial Graphite on a commercial scale.

OFFICE OF THE SECRETARY INDUSTRIAL RESEARCH BOARD, BANGALORE.
No. 138
Date 18/1/41

Yours faithfully,
B K Ram Prasad

1. Prof. K. Aston, B.Sc., Tech. M.I.E.E.,
   Indian Institute of Sience, Hebbal- Bangalore.
2. D.V. Krishna Rao, Esq., B.A.,
   Superintendent, Open Hearth Furnace,
   Mysore Iron & Steel Works, Bhadravati.
3. N.K. Seshadri Iyengar, Esq., B.A., M.Sc.,
   Superintendent, Bamboo-pulp Section,
   The Mysore Paper Mills, Ltd., Bhadravati.

Copy forwarded with compliments to Mr.K. Parthasarathi, Secretary, Industrial Research Board, Bangalore, for information, in continuation of D.O.No.59 of 11th January 1941.

B K Ram Prasad

DR. B. K. RAM PRASAD,
M.A. (HON.), D.SC., M.I.E., (IND.),
SUPERINTENDENT.

OFFICE OF THE SUPERINTENDENT
POWER AND LIGHTING.

D. O. No. 64

CHAMPION REEFS, 16th Jany. 1941.
(K.G.F.)

Dear Sir,

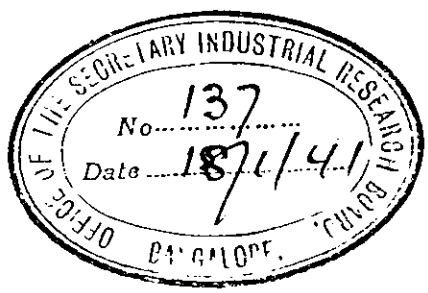
RBS 18/1

Manufacture of Graphite and
Graphite products in the State.

In continuation of my D.O.leter No.59 dated the 11th instant, I beg to inform you that one of the members, Mr.D.V. Krishna Rao has agreed to attend the Meeting at Bangalore, and the other, Mr.Seshadri Iyengar has pleaded inability to attend on the 20th instant. I have not yet heard from Prof. Ashan. However, if at least two members attend the Meeting, the note presented by Mr.P.S. Narayana will be discussed and a report submitted.

Yours sincerely,
B K Ram Prasad

K. Parthasarathi, Esq., B.A.,
Secretary,
Industrial Research Board,
Bangalore.



P.S.Narayana
Consulting Engineer &
Geologist

Encl: 1

41, East Park Road,
Malleswaram,
Bangalore, 19th December

Dear Sir,

I enclose herewith a brief note on Manufacture of Graphite and Graphite Products in the Mysore State for your kind perusal. I hope it would interest you.

Thanking you,

Yours sincerely,

P Narayana

Amin Ul Mulk
Sir Mirza M. Ismail
K.C.I.E.,C.B.E.,
Dewan of Mysore,
B A N G A L O R E.

BRIEF NOTE.

MANUFACTURE OF GRAPHITE PRODUCTS IN MYSORE STATE

On 16.11.1940, in a note for perusal, presented to the Dewan, the undersigned stated that it is now opportune to develop the abrasives and adhesives industry as well as the graphite industry in the State.

Graphite now being mined by the Mysore Geological Department, is of the amorphous variety and is being consumed chiefly by the Bhadravathy Iron Works in their foundries. It is not found to be rich enough for special purposes unless concentrated. Concentration of this material is already engaging the attention of the Department in connection with electrode manufacture in the State.

The Indian Institute of Science also has taken up recently similar work as part of the Indian Industrial Research Programme.

The undersigned, in further, took to the study of the assimilation of graphite on metallic surfaces to determine the usefulness of flake graphite in the manufacture of special lubricants and paints.

The market position in Bangalore, in respect of graphite and its products imported, is as follows:

1) Miscellaneous graphite products including crucibles Rs20000/-per year.

2) Foundry graphite of over 50 to 60% carbon .. .. Rs10000/-per year

3) Flake graphite.. Rs 5000/- do

The requirements of Bhadravathy for electrode manufacture is expected to grow up to Rs5000/- annually hereafter.

When 99% carbon graphite is made available the demand for that material from outside the state, is expected to rise to a minimum of at least Rs20000/- every year.

The use of air floated graphite for axle bearings in Railwsy Engineering practice is growing into an economic necessity. Reports indicate that lubricants now in use are imported from foreign countires.

RAW MATERIAL COST

It is desirable at the outset to exploit the resources of crystalline graphite in Mysore District and bring them under State Reserves.

To start with, the crystalline graphite can be purchased at very economical rates from mines outside the State. In this connection, it may be mentioned that Messrs. Gouthamy Mining Works, Kovvur, who are approved suppliers of engineering material to the Mysore Government have intimated to the undersigned their desire to supply graphite at very concessional rates if it is used

in making graphite products. Till the local supplies are made available, graphite of the required specification may be bought from outside.

SCHEME OF DEVELOPMENT

The scheme of industrial development would comprise concentration of graphite for manufacture of a) Electrodes, b) Wet lubricants and c) Dry lubricants, d) paints,(anti-corrosive & acid proof),e) Refractories.

There is no enterprise in India making the first four on any large scale. The production of articles from a to d referred above, would mainly be taken up, as they alone would in due course grow to a very big affair. However, activity under item e) may be confined to special crucibles to meet requirements of alloy steel manufacture and gold and other non-ferrous metal industries.

CAPITAL & RETURNS

At the outset, capital investment of Rs20000/- under the following items is essential.

a) Rs9000/- -- Machinery.
b) Rs3000/- -- Buildings.
c) Rs4000/- -- Raw Material
d) Rs4000/-Running Expenses.

The economic size of the plant is such as to handle 100 tons of crude graphite of not less than 40% carbon of value not more than Rs75/- per ton, on delivery at Works, to produce 10 tons lubricants, 20 tons 99% carbon graphite, 2 tons special crucibles and 2 tons paints per

year of 300 days of 8 hours working.

The total value of the products manufactured works out to Rs.40000/- to Rs50000/- per year.

The net average revenue from sale of products is estimated at Rs.10000/- to Rs.15000/- per annum

STANDARDISATION OF PRODUCTS.

At this stage, it has become essential to make use of the equipment in the laboratories of the Engineering College and the Central Industrial Workshop for purposes of standardisation of the graphite products.

The co-operation of the Mysore State Railways in this direction, is very much desired.

Thanking you,

CONSULTING ENGINEERS & AGENTS

ENCLO... .....

IN REPLY REFER TO No. 6330

Telegraphic Address: "GOMED"

GOVERNMENT OF MYSORE

ELECTRICAL DEPARTMENT

OFFICE OF THE SUPERINTENDENT,
POWER & LIGHTING, (K.G.F.)

Championreefs. 21st. January 1941.

(MYSORE, S. INDIA.)

The Secretary,
Industrial Research Board,
BANGALORE.

S i r,

GRAPHITE & GRAPHITE PRODUCTS SUB-COMMITTEE.

I have the honour to confirm my telephone conversation with you on the 20th instant and to inform you that the Graphite Sub-Committee discussed the Note by Mr. P.S.Narayana and the possibilities of the manufacture of Graphite Electrodes on a commercial scale. The Minutes of the Meeting are enclosed herewith for kind information. The opinion of the Sub-Committee re: the note of Mr. P.S. Narayana will be submitted in a day or two.

Await & put up a note.

The Sub-Committee desire that Mr. D.V. Krishna Rao be the Convener of the above Sub-Committee, as he is incharge of the Experiments being conducted at Bhadravati and he can arrange for the Meetings, as and when there is progress of work. I request this may kindly be approved and Mr. D.V. Krishna Rao intimated accordingly.

Maybe submitted to the Chairman for appl.

OFFICE OF THE SECRETARY INDUST. 22/1
No. 148
Date 22/1/41
BANGALORE.

Re. 377/1401
Acknowledge
22/1

I have the honour to be,
S i r,
Your most obedient servant,

B K Ram Prasad
Superintendent, KGF.

RP/BVS.

Submit Note for
20/1/41

Proceedings of the Graphite Sub-Committee Meeting of the Research Board held at the Govt. Director's Office, United India Buildings, Bangalore, at 10 A.M. on Monday the 20th January 1941.

PRESENT.

1. Prof. K. Aston, B.Sc., Tech. M.I.E.E., President.
2. Mr. D.V. Krishna Rao, B.A.
3. Mr. B.K. Rama Prasad, M.A.(Hon.), D.Sc.,

ABSENT.

1. Mr. N. K. Seshadri Iyengar, B.A., M.Sc.,

---

1. Discussion on the note submitted by Mr. P.S.Narayana regarding Graphite products was taken up.

The opinions sent in writing by Mr. N.K.Seshadri Iyengar and Prof. Aston were put before the Committee.

The views of the Committee were drafted and Professor Aston promised to send it on to the Convenor for being submitted to the Secretary, Research Board.

2. Possibilities of the production of artificial graphite on a commercial scale was taken up next.

The Committee was informed by Mr. D.V. Krishna Rao that further experiments are going to be conducted on a large scale at the Mysore Iron and Steel Works and it will be possible to formulate a commercial scheme after the results are known.

Professor Aston intimated that the results of experiments which are being conducted in the institute would be made available in due course.

BK Rama Rao

Telephone No. 135 Central

ENCLO.

IN REPLY REFER TO No. 62:6-49.

Telegraphic Address:

"GOMED"

GOVERNMENT OF MYSORE

ELECTRICAL DEPARTMENT

OFFICE OF THE SUPERINTENDENT,
POWER AND LIGHTING, (K.G.F.)

Championreefs, 22nd January *194* 1.

(MYSORE, S. INDIA.)

The Secretary,
Industrial Research Board,
Bangalore.

S i r,

Graphite & Graphite Products Sub-Committee.

In continuation of my letter No.6230 of the 21st instant, I beg to enclose herewith the opinion of the committee re: the note of Mr.P.S. Narayana, and the individual reports by Prof. K. Aston and Mr.N.K. Seshadri Iyengar for kind information. The original note of Mr P.S. Narayana is herewith returned.

I have the honour to be,
S i r,
Your most obedient servant,
BK Ramprasad
Superintendent, KGF.

SECRETARY INDUSTRIAL RESEARCH BOARD OF THE GOVT. OF MYSORE
No. 156
Date 28/1/41

No. 377/41
Acknowledge
Submit
Date put up
28/1/41

MINUTES of the Meeting of the GRAPHITE Electrode Sub-Committee of the Industrial Research Board, Bangalore, held on 20th January - 1941 at Bangalore.

1. The meeting of the sub-committee was held at the office of the Government Director of Industrial Concerns, Bangalore on Monday the 20th January 1941.

2. The following members were present:-

1. Prof. K. Aston.
2. Mr. D.V. Krishna Rao.
3. Dr. B.K. Ram Prasad.

3. Prof. K. Aston was voted to occupy the chair.

4. The following items on the agenda were considered.

(a) A note submitted by Mr. P.S. Narayana regarding graphite products.

(b) Possibility of the production of artificial graphite on commercial scale.

5. The note of Mr. Narayana was circulated amongst members before-hand. Prof. K. Aston and Mr. Seshadri Iyengar submitted their views in form of notes which are appended hereto.

6. The committee was of the opinion that the note submitted by Mr. Narayana was superficial. Details of proposed processes and necessary equipment was not given. Items included under machinery, buildings etc. were also not given. Figures given regarding probable demand for these materials were vague and could not be scrutinised as sources from which they were taken were not mentioned.

7. Mr. Narayana does not give information as to whether the various processes in connection with purification of natural graphite and preparation of paints and lubricants have been successfully tried out by him. The committee are not aware of any definite published information on the subject which would enable the Government to

to undertake the processes on commercial basis immediately. Unless Mr. Narayana gives definite information on this point it is very difficult to consider his proposals.

8. Investigations in connection with manufacture of graphite electrodes, purification of natural graphite and allied subjects are at present being carried out at the Indian Institute of Science, Bangalore by the Board of Scientific and Industrial Research, Calcutta, and at the Mysore Iron and Steel Works by the Government of Mysore. The Committee was of the opinion that it would be advisable to await the results of these investigations before any action is taken in connection with graphite schemes.

A NOTE submitted to the Graphite Electrode sub-committee of the Board of Industrial Research, Government of Mysore, by Prof. K. Aston, M.I.E.E., Indian Institute of Science.

Re: Mr.P.S. Narayana's Scheme.

1. According to Mr. P. S. Narayana's scheme, requirements for Mysore State are:-

1. Crucibles, lubricants etc.	Rs.20,000
2. Foundry graphite	Rs.10,000
3. Flake "	Rs. 5,000
4. Graphite electrodes	Rs. 5,000.

2. Items 2 and 3 above require no manufacture and can be directly secured from the Mines.

3. Item 4 is under investigation and we think Mr. Narayana will not undertake to manufacture it immediately. Further, if the experiments carried out at Bhadravati and Indian Institute of Science succeed it would be possible to manufacture that commodity on a larger scale in which case the question of supplying local market only does not arise.

4. Item 1 which we think includes crucibles, lubricants and paints has a local market of Rs.20,000 only.

5. It appears that some preliminary work is necessary to ascertain the economic and satisfactory working of processes involved in preparation of lubricants (colloidal graphite etc.) and purification of natural graphite.

Unless this is done and satisfactory results obtained, it would not be advisable to undertake commercial manufature of these products at once.

6. We are not aware whether Mr. Narayana has conducted any experiments in connection with preparation of these as well as purification of graphite which he proposes to do.

7. If Mr. Narayana has conducted any experiments we would like to know the results and get the products made by him tested before giving any further opinion on the point.

8.

8. Research on various subjects mentioned in this scheme as well as some more allied subjects such as manufacture of carborandum and abrasives is being carried out under the Government of India Board of Scientific and Industrial Research and is likely to yield results in the near future. The Government of Mysore might therefore think it worthwhile to postpone any scheme in this connection for some time and undertake the manufacture in co-operation with the central Government as soon as the results of the present investigations are out. It would also be possible then to establish the industry on a wider basis and develop it in all its commercially economic aspect.

Department of Electrical Technology,
Indian Institute of Science,
Bangalore dated 21st January 1941.)

PROFESSOR.

Re: Note from Mr. P.S. Narayana, Consulting Engineer and Geologist re: the manufacture of Graphite and Graphite products in the State.

We have to make a distinction between the "Natural Graphite" which is mined from the earth and the "Artificial Graphite" or graphitised carbon produced in the electric furnace. The natural graphite has been divided into three grades, with respect to its grinding characteristics: flake, crystalline and amorphous. The flake variety is generally most difficult to reduce to a fine - powder and the crystalline is the most abrasive.

Flake graphite is the best for lubrication. The selection and preparation of graphite for lubrication requires the observance of two principal considerations viz., the structure of the graphite itself and the character and the amount of other matter incorporated with it as impurities. These depend on the source of graphite. The best and longest records of satisfactory protection against corrosion are said to be held by graphite paints containing silica in intimate admixture with tough crystalline foliated graphite containing as high as 95% carbon.

Artificial graphite is produced in the electri c furnace either as a powder or as shaped articles such as Electrodes, brushes etc. Low ash anthracites or petroleum cokes are employed as raw materials. In the preparation of graphite articles, the materials are formed and baked into an amorphous-carbon article, after which they are graphitised in the electric furnace. The ash content of this kind of graphite is very low and its ready machinability is well-known as well as its resistance to most forms of chemical attack. This graphite is the standard anodic material for electrolysis of brine to produce chlorine and caustic. Amorphous carbon electrodes and also those made from natural - graphite have been used in the electrolysis of brine. The results have been far from satisfactory and the period of service as compared with graphitised carbon is negligible.

Further

Further in the case of graphite electrodes, one has to make a further distinction: electrodes for electro-chemical work as in the case of production of chlorine and soda and electrodes for electro-thermal work as in the case of electric furnace for production of sodium sulphide, aluminium etc. The electro-chemical electrodes have a very low ash content as low as 0.35%.

Considering from these points, I am of the opinion that the scheme of Industrial Depelopment as proposed by Mr.P.S. Narayana for the concentration of graphite mined by Gouthamy Mining Works, Kovvur, Madras Presidency or by the Mysore Geological Department, can at best be employed for the manufacture of wet and dry lubricants, and paints which is beyond the scope of consideration by the Graphite Electrodes Sub-Committee and that the scheme is not suitable for the manufacture of electrodes.

The Mysore Paper Mills Ltd.)
Bhadravati.)
Dated 15th January 1941.)

N.K. Seshadri Iyengar.

393/40-1 Eng: Ins

31st January 1

M. Venkatesa Iyengar, Esq., M.A.,
Secretary to the Government of Mysore,
Development Department, Bangalore.

Subject: Manufacture of Abrasives and Graphites in the State.

With reference to your letter No.D.3039/I&C.230-40-12 dated 6th January 1941, forwarding the schemes on the above subject prepared by Mr.P.S. Narayana, Consulting Industrial Geologist and requesting to forward the views of the appropriate Sub-Committee, am directed to state that the Director of Geology who is the Conv of the Abrasives Sub-Committee is of opinion that without scruti ing Mr.Narayana's final report on his further investigations Sub-Committee will not be in a position to arrive at definite ion and submit specific recommendations on the present scheme, consideration of Government. I send herein enclosed a copy No.9774-43 dated 23rd January 1941, received from the Direct Geology, for the information of Government.

With regard to the other scheme on the manufactu Graphite and Graphite products in the State, the same was placed before the Graphites Sub-Committee for consideration. I send enclosed a copy of the minutes of the Sub-Committee expressing its views on the note of Mr.Narayana.

I have the honor to be,
Sir,
Your most obedient servant,

Secretary

Copy of minutes of the meeting of the GRAPHITEs Sub-Committee of the Industrial Research Board, Bangalore held on 20th January 41 at Bangalore.

The meeting of the Sub-Committee was held at the Office of the Government Director of Industrial Concerns, Bangalore on Monday the 20th January 1941.

2. The following Members were present:-

1) Prof.K.Aston. Indian Institute of Science.
2) Mr.D.V. Krishna Rao. Mysore Iron and Steel Works.
3) Dr.B.K. Ramprasad. Superintendent, Power & Light

3. Prof.K. Aston was voted to occupy the chair.

4. The following items on the agenda were considered.

a) A note submitted by Mr.P.S. Narayana regarding Graphite products.
b) Possibility of the production of artificial graphite on a commercial scale.

5. The note of Mr.Narayana was circulated amongst Members before hand. Prof.K.Aston and Mr.Seshadri Iyengar submitted their views in form of notes which are appended hereto.

6. The committee was of the opinion that the note submitted by Mr.Narayana was superficial. Details of proposed processes and necessary equipment was not given. Items included under machinery buildings, etc. were also not given. Figures given regarding probable demand for these materials were vague and could not be scrutinised as sources from which they were taken were not mentioned.

7. Mr.Narayana does not give information as to whether the various processes in connection with purification of natural graphite and preparation of paints and lubricants have been successfully tried out by him. The Committee are not aware of any definite published information on the subject which would enable the Government to undertake the processes on commercial basis immediately. Unless Mr.Narayana gives definite information on this point it is very difficult to consider his proposals.

8. Investigations in connection with manufacture of graphite electrodes, purification of natural graphite and allied subjects are at present being carried out at the Indian Institute of Science Bangalore by the Board of Scientific and Industrial Research, Calcutta and at the Mysore Iron and Steel Works by the Government of Mysore.

The Committee was of the opinion that it would be advisable to await the results of these investigations before any action is taken in connection with graphite schemes.

Secretary,
Industrial Research Board,
Bangalore.

Copy of Note from Mr. M.K Seshadri Iyengar, M.Sc., Mysore Paper Mills, Ltd., submitted to Graphites Sub-Committee of the Industrial Research Board.

Re: Note of Mr. Narayana, on the manufacture of Graphite and Graphite products in the State.

We have to make a distinction between the "Natural Graphite" which is mined from the earth and the "Artificial Graphite" or graphitised carbon produced in the electric furnace. The natural graphite has been divided into three grades, with respect to its grinding characteristics: flake, crystalline and amorphous. The flake variety is generally most difficult to reduce to a fine powder and the crystalline is the most abrasive.

Flake graphite is the best for lubrication. The selection and preparation of graphite for lubrication requires the observance of two principle consideration viz., the structure of the graphite itself and the character and the amount of other matter incorporated with it as impurities. These depend on the source of graphite. The best and longest records of satisfactory protection against corrosion are said to be held by graphite paints containg silica in intimate admixture with tough crystalline foliated graphite containing as high as 95 carbon.

Artificial graphite is produced in the electric furnace either as a powder or as shaped articles such as electrodes, brushes etc. Low ash anthracites or petroleum cokes are employed as raw-materials. In the preparation of graphite articles, the materials are formed and baked into an amorphous carbon article, after which they are graphitised in the electirc furnace. The ash content of this kind of graphite is very low and its ready machinability is well-known as well as its resistance to most forms of chemical attack. This graphite is the standard anodic material for electrolysis of brine to produce chlorine and caustic. Amorphous carbon electrodes and also those made from natural graphite have been used in the electrolysis of brine. The results have been far from satisfactory and the period of services as compared with graphitised carbon is negligible.

Further in the case of graphite electordes, one has to make

case of production of chlorine and soda and electrodes for electro-thermal work as in the case of electric furnace for production of sodium sulphide, almuniium etc. The electro-chemical electrodes have a very low ash content as low as 0.35%.

Considering from these points, I am of the opinion that the scheme of Industrial Development as proposed by Mr.P.S. Narayana for the concentration of graphite mined by Gouthamy Mining Works Kovvur, Madras Presidency or by the Mysore Geological Department can at best be employed for the manufacture of wet and dry lubricants, and paints which is beyond the scope of consideration by the Graphite Electrodes Sub-Committee and that the scheme is not suitable for the manufacture of electrodes.

sd. N.K. Seshadri Iyengar.

Secretary,
Industrial Research Board,
Bangalore.

this connection for some time and undertake the manufacture in cooperation with the Central Government as soon as the results of the present investigations are out. It would be also possible then to establish the Industry on a wider basis and develop it in all its commercially economic aspect.

PROFESSOR.

Secretary,
Industrial Research Board,
Bangalore.

A Note submitted to the Graphites Sub-Committee of the Board of Industrial Research, Government of Mysore by Prof.K-Aston, M.I.E.E., Indian Institute of Science.

---

o . .o

Re: Mr.P.S. Narayana's Scheme.

---

1. According to Mr.Narayana's scheme, requirements for Mysore State are:-

1) Crucibles, lubricants etc.	..	Rs.20,000/-
2) Foundry graphite.	..	Rs.10,000/-
3) Flake "	..	Rs. 5,000/-
4) Graphite electrodes	..	Rs. 5,000/-

2. Items 2 and 3 above require no manufacture and can be directly secured from the Mines.

3. Item 4 is under investigation and we think Mr.Narayana will not undertake to manufacture it immediately. Further, if the experiments carried out at Bhadravati and Indian Institute of Science succeed it would be possible to manufacture that commodity on a larger scale in which case the question of supplying local market only does not arise.

4. Item 1 which we think includes crucibles, lubricants and paints has a local market of Rs.20,000/- only.

5. It appears that some preliminary work is necessary to ascertain the economic and satisfactory working of processes involved in preparation of lubricants (colloidal graphite etc.) and purification of natural graphite.

Unless this is done and satisfactory results obtained, it would not be advisable to undertake commercial manufacture of these products at once.

6. We are not aware whether Mr.Narayana has conducted any experiments in connection with the preparation of these as well as purification of graphite which he propose to do.

7. If Mr.Narayana has conducted any experiments we would like to know the results and get the products made by him tested before giving any further opinion on the point.

8. Research on various subjects mentioned in this scheme as well as some more allied subjects such as manufacture of carborandum and ~~xxxxxx~~ abrasives is being carried out under the Government of India Board of Scientific and Industrial Research and is likely to yield results in the near future. The Government of Mysore might therefore think ~~that~~ it worthwhile to postpone any scheme in this

399-1

1) Copy of the foregoing is forwarded with compliments to the Chairman, Mysore Iron and Steel Works, Bhadravati, for information.

2) Copies of the above forwarded with compliments to Dr.B.K. Ram Prasad, M.A., D.Sc., Superintendent, Power and Light, Championreefs (K.G.F.) for information and necessary further action.

Secretary,
Industrial Research Board.

31st January

3987

D.V. Krishna Rao, Esq., B.A.,
Superintendent, Open Hearth Furnace,
Mysore Iron and Steel Works,
Bhadravati.

Subject: Graphite and Graphite products Sub-Committee.

--

I am directed to inform you that as per the recommendations of the Sub-Committee, you have been appointed as the CONVENOR of the Graphites Sub-Committee in future vice Dr.B.K. Ram Prasad. Dr.Prasad will however, continue to serve the above Sub-Committee as a Member. The relevant records of the Sub-Committee may kindly be got from Dr.Prasad, to enable you to take necessary further action.

I have the honor to be,
Sir,
Your most obedient servant,

SD.K. Parthasarathi.

SECRETARY.

DR. B. K. RAM PRASAD,
M.A. (HON.), D.SC., M.I.E., (IND.),
SUPERINTENDENT.

OFFICE OF THE SUPERINTENDENT
POWER AND LIGHTING,

D. O. No.

CHAMPION REEFS, 4th. Febry. 41.
(K.G.F.)

Dear Sir,

In accordance with the instructions of the Secretary, Industrial Research Board, Bangalore, I wish to enclose herewith the file of papers connected with the Graphite Sub-Committee, for your kind reference and record.

Yours Sincerely,
Ram Prasad

RP/BVS.

To

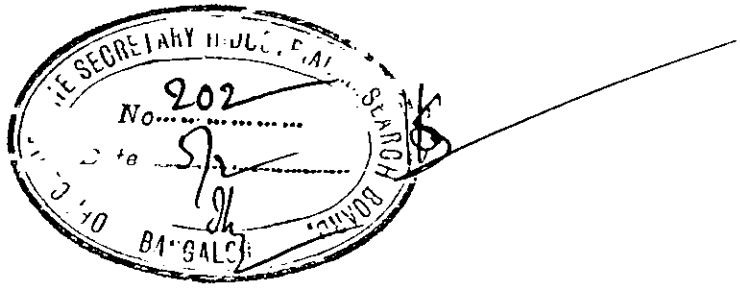
D. V. Krishna Rao, Esq., B.A.,
Superintendent, Open Hearth Furnace,
Mysore Iron and Steel Works,
BHADRAVATI.

Encl:- One File of Papers.

V.O.#71

Copy submitted to the Secretary, Industrial Research Board, Bangalore, for information, with reference to his letter No.398 dated 31-1-41.

BK Ram Prasad



INDIAN INSTITUTE OF SCIENCE.

MALLESWARAM P. O., BANGALORE, INDIA.

J. C. GHOSH, D.Sc., F.N.I.,
DIRECTOR.

D/1915

TELEGRAMS:
"SCIENCE", BANGALORE.
CODE: A. B. C. 5TH EDITION.

4th February 1941.

The Secretary,
Industrial Research Board,
Government of Mysore,
Mysore Road, Bangalore.

Dear Sir,

In connection with the scheme of research on Graphite Electrodes, we are badly in need of the following machinery:-

1. A slug mill.
2. An extrusion press preferably giving a total pressure of about 75 tons.

The machines are not in stock in India, from Kundedabs and it will take a very long time to get them from abroad. I shall be glad if you will kindly make enquiries whether such machines can be had in India on a reasonable price or can be spared on loan from any concern that you may know of.

Write to Eng concerns.
5/1

OFFICE OF THE SECRETARY INDUSTRIAL R. BOARD
No. 201
Date 5/2
BANGALORE.

Yours faithfully,

J. C. Ghosh
Director.

1) Acknowledged
5/2

Government of Mysore.

Inddstrial Research Board.

No. 428-7

Office of the Secretary,
Mysore Rd,
Bangalore, Dated, 6th February 1941.

To (1) G.T.L. 2) G.E.C. 3) C.D.W.
4) Kolar Gold Mines. 5) Steel Construction Co. 6) Mysore Robes
7) Sree Krishna Engineering Works

Dear Sir,

I shall be obliged if you can kindly let me know immediately if the following machinery are available with you and if so whether they could be spared on loan for some time; otherwise the price of the machinery may kindly be intimated. The machinery are required in connection with the research experiments on Graphite electrodes to be taken up at the Indian Institute of Science.

1) A slug Mill.
2) An extrusion press preferably giving a total pressure of about 75 tons.

Yours faithfully,

Secretary,
Industrial Research Board,
BANGALORE.

TELEPHONE NO. 431

MYSORE GOVERNMENT LAC & PAINT WORKS.

N. K. RANGA RAO Esq, B.Sc., A.I.I.Sc.,
OFFICER-IN-CHARGE

Ediga Extension,
MYSORE.

Our Ref. No. 2084

Enc.

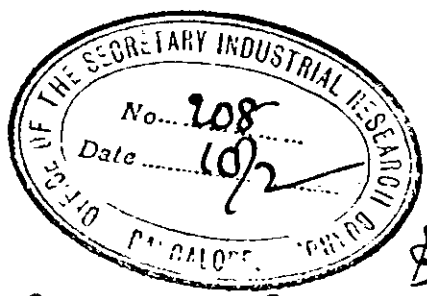
Date 8th Feb. 1941.

To

The Secretary,
Industrial Research Board,
Mysore Road,
BANGALORE CITY.

Dear Sir,

With reference to your letter No. 428-7/40-41 dated 6th Feb. 1941, we regret very much to state that the two items of mechinery required by you are not available with us.



Yours faithfully,

N. K. Ranga Rao.

Officer-in-charge.

Acknowledged
10/2

10/2

APPROVED BY THE GOVERNMENT OF MYSORE

SRI KRISHNA ENGINEERING WORKS,

GENERAL FOUNDERS MACHINERY MANUFACTURERS AND REPAIRERS

COTTONPET. BANGALORE CITY.

M. K. NAYAGAR,
SOLE PROPRIETOR

SKEW

Date 7th Feb. *19* 41

The Secretary,
Industrial Research Board,
Mysore Road,
Bangalore.

Dear Sir,

We are in receipt of your enquiry for letting on hire A SLUG MILL AND A PRESS, for which we thank you.

Regarding the same we regret to inform you that we do not have the same in use at present in our works. However if you are thinking of ordering for new ones, we shall be glad to quote for them on receipt of relative drawings.

Yours faithfully,
For SRI KRISHNA ENGINEERING WRKS
M. K. Nayagar
Proprietor. 7/2/41

Acknowledge

9/2/41

SRB

OFFICE OF THE SECRETARY INDUSTRIAL RESEARCH BOARD
No.....
Date .....
BANGALORE

TE[illegible]ADDRESS—' MACHINER"

TELEPHONE No. 2002, CITY.

(GOVERNMENT OF MYSORE)

THE CENTRAL INDUSTRIAL WORKSHOP

(Department of Industries and Commerce)

MR. A. V. RAGHAVACHAR, B.SC. (MYSORE),
M.SC. (TECH.), MANCHESTER, A.M.I. MECH. E. (LONDON),
A.M.I.E. (INDIA),
INDUSTRIAL ENGINEER AND SUPERINTENDENT.

Ref. No. 1787 .... *Bangalore,* 10th February *194* 1.

ALL COMMUNICATIONS TO BE ADDRESSED TO THE SUPERINTENDENT.

For:—

Improved "MYSORE" Sugarcane Mills certified to be Efficient

Milling Work of all sorts

Improved Plough Parts

Paris Green Equipment

D. S. P. Sprayers

Manufacture of Rock Drills, Etc.

V. P. P., B. City.

To

The Secretary,
Industrial Research Board,
Mysore Road,
Bangalore City.

Dear Sir,

With reference to your letter No.428-7/40-41 date 6th February 1941 re: loaning of machinery noted ther I regret to inform you that I am not in a position to loan any machinery since all of them are fully engaged.

OFFICE OF THE SECRETARY INDUSTRIAL RESEARCH BOARD BANGALORE. No. 218/40-1 Date 11/2/41

Yours faithfully,

M.V. Raghavachar

Superintendent.

PRF-2[illegible]

11/2/41

TELEPHONE: 2081 TELEGRAMS: "STRUCTURES"

THE STEEL CONSTRUCTION COMPANY, LTD.

(THE CITY WORKSHOP)

STRUCTURAL CONCRETE AND MECHANICAL ENGINEERS
MACHINERY AGENTS AND GENERAL CONTRACTORS
SPECIALISTS IN THE MANUFACTURE, REPAIRS AND CASE-HARDENING OF OIL EXPELLER PARTS

HARDINGE ROAD,
SHANKARPURAM,
BASAVANGUDI P.O.
Bangalore, (S. India)

In Reply Please Quote:
S/01075/5

DEPARTMENT
STRUCTURE

February 11th 1941.

The Secretary,
The Industrial Research Board,
Mysore Road,
Bangalore.

Dear Sir,

With reference to your enquiry No.428-7 of 6th current, we regret we do not have any of the machines you have called for. We are prepared to make them for you if suitable drawings are sent.

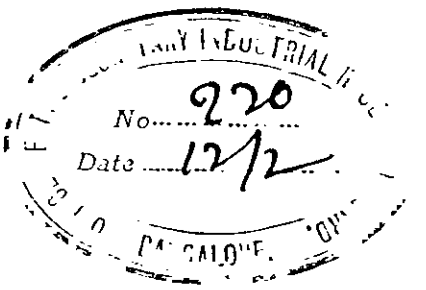
Yours faithfully,
THE STEEL CONSTRUCTION CO.LTD.

MANAGING DIRECTOR.

ks)

1) Ack.
2) Compile + Put up for a reply to Mr. Ghosh

12/2/41



All offers and prices, unless stated to be firm, are without engagement and subject to stocks being available.

TELEPHONE NO. 256, CITY

GOVERNMENT INDUSTRIAL & TESTING LABORATORY

MALLESWARAM, P.O.
BANGALORE

YOUR REF. NO. 8205

OUR REF. NO.

ENC.

Date 19th February 1941.

To

The Secretary,
Industrial Research Board,
Mysore Road, Bangalore.

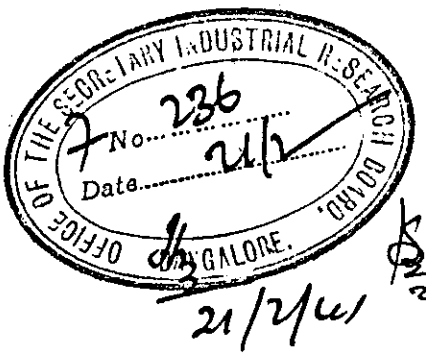
Dear Sir,

Re:Machinery.

With reference to your Circular No. 4287, dated 6th February, 1941, we regret to advise that we have no such machinery.

Yours faithfully,

Chief Chemist I/C.
Indl.& Testing Laboratory.



21/2/41 21/2

From

The General Manager
GOVERNMENT ELECTRIC FACTORY
Mysore Road, BANGALORE CITY.

To

The Secretary,
Industrial Research Board,
Mysore Rd., Bangalore.

Ref. No. S-17260 *Date* 13th February 1941.

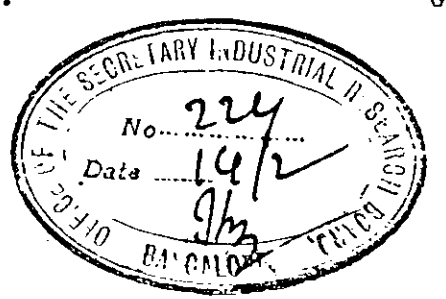
Dear Sir,

With reference to your Circular No.428-7/40-41 of the 6th. instant, we regret we do not have either a Slug Mill or an Extrusion Press. However, we could spare a Compression Press capable of exerting 75 tons, if it suits your purpose.

Yours faithfully,
Government Electric Factory.

General Manager.

HSK.



496/401

The Director,
Indian Institute of Science,
Bangalore.

xxxx Dear Sir,

Refce: Your letter No.D.1915 dated 4th February 41.

Sub: Slug Mill and Extrusion Press.

Referring to the above, I write to inform you that the General Manager, Government Electric Factory, Mysore Road, Bangalore, has written to say that he could,however, spare a compression press capable of exerting 75 tons, if it suits your purpose.

The following* two Engineering Firms have intimated that they are prepared to make them for you, if suitable drawings are sent . You may kindly correspond with them direct.

* 1) The Steel Construction Company, Ltd., Hardinge Road, Shankarapuram, Basavanagudi P.O. Bangalore.

2) Sri Krishna Engineering Works, Cottonpet, Bangalore City.

Yours faithfully,

Secretary.

HSR)

Government of Mysore.

Industrial Research Board.

No. 545-13/40-41 Bangalore, Dated, 27th March 1941.

From

K. Parthasarathi, Esq., B.A.,
Secretary, Industrial Research Board,
Mysore Road, Bangalore.

To

Sir,

Subject: Sub-Committee - Meetings.

I am directed to ~~dare~~ inform you that the date of the Sub-Committee meetings are not intimated by some of the Convenors. I am therefore desired to request you to be so good as to keep the Board informed of the engagements of the Sub-Committees as and when the meetings areconvened.

I have the honor to be,
Sir,
Your most obedient servant,

K. Parthasarathi

SECRETARY.

THE MYSORE IRON AND STEEL WORKS
BHADRAVATI

Mr. D. V. Krishna Rao, B.A.,

28th March, 1941.

4025

K.Parthasarathi, Esq., B.A.,
Secretary, Industrial Research Board,
Mysore Road,
BANGALORE.

Dear Sir,

Sub Committee Meeting.

With reference to your Circular letter No.545-13/-40-41 of 27th March, 1941, I wish to inform you that no meeting of the Electrodes Sub Committee was held after its last meeting held at Bangalore on 20th January 1941. I shall arrange to keep you informed of the dates of the Sub Committee meetings and the proceedings thereof.

OFFICE OF THE SECRETARY INDUSTRIAL R. SEARCH BOARD. BANGALORE.
No. 274
Date 31/3/41

Yours faithfully,

D V Krishna Rao

Convenor,
Graphite Electrodes and
other Products Sub-Committee.

31/3/41

PMC

Confidential

INDUSTRIAL RESEARCH BOARD

Proceedings of the Second Meeting of the Industrial Research Board Sub-Committee, held on Saturday the 15th March 1941 at 1 p.m. at the Chambers of the First Member of Council.

PRESENT

Rajamantrapravina N. Madhava Rau, Esq., B.A.,B.L.,
First Member of Council. (*Chairman*).

MEMBERS

1. Mr. M. Venkatanaranappa, B.A.,
   Chairman, Mysore Iron & Steel Works, etc., Bangalore.
2. Mr. S. G. Sastry, B.A., M.Sc., (Lond.),
   Director, Sandalwood Oil Factory, Mysore.
3. Mr. B. G. Appadurai Mudaliar, B.A.,B.Sc.,A.M.I.,Mech. E.,
   Director of Industries & Commerce in Mysore, Bangalore.

Mr. K. Parthasarathi, B.A.,
General Manager, Government Electric Factory, Bangalore.
(*Secretary*).

ATTENDED BY INVITATION

1. Mr. M. Venkatesa Iyengar, M.A.,
   Secretary to the Government of Mysore,
   Development Department, Bangalore.

ABSENT

1. Mr. E. V. Ganapati Iyer, B.Sc.,
   Government Director of Industrial Concerns, Bangalore.

AGENDA

1. Brief review of work done by various sub-committees.
2. Compilation of information *re* Industrial Researches in the State.
3. Scope and Functions of the Research Board.
4. Consideration of subjects proposed by:—

(*a*) Government Director of Industrial Concerns—Manufacture of glass bulbs, silk worm guts, etc.

(*b*) Director of Industries & Commerce—suggesting that certain items of researches taken up by the Government of India may also be taken up here.

(*c*) General Manager, Government Electric Factory—Utilisation of steel shavings.

(*d*) Manager, Mysore Spun Silk Mills, Ltd., Channapatna—Manufacture of bobbins, shuttles, etc.

(*e*) Superintendent, Government Soap Factory—Cultivation of patchouli and geranium in the factory nursery.

(*f*) Dr. A. V. Varadarajaiengar, B.A., D.Sc., A.I.C., Indian Institute of Science—Manufacture of starch from sweet potato.

5. Any other Subjects.

GENERAL

The Chairman invited reference to the agenda circulated to members and said that the review of work done by the several sub-committees may be taken up for consideration.

Manufacture of Super-phosphates

PERSONNEL

(1) Dr. J. C. Ghosh, D.SC., F.N.I., Director of Indian Institute of Science, Bangalore. (CONVENOR)

(2) Mr. S. G. Sastry, B.A., M.SC., (Lond.), Director, Sandalwood Oil Factory, Mysore.

(3) Dr. K. R. Krishnaswamy, B.A.,D.Sc., (Lond.), F.I.C., Indian Institute of Science, Bangalore.

(4) Mr. E. V. Ganapati Iyer, B.Sc., Government Director of Industrial Concerns, Bangalore.

The proceedings forwarded by Dr. Ghosh, Convenor of this sub-committee, were read and recorded. The Director, Sandalwood Oil Factory, explained the work done by the sub-committee so far. It was resolved that further action might be taken in light of the sub-committee's report.

After general discussions, the chairman suggested that the Managing Director, Mysore Chemicals & Fertilisers, Ltd., might be asked to ascertain any reduction in the freight for the transport of bones from Goribidnur, Bangalore and other important outlying stations to Belagola would be helpful and what traffic could be promised.

(2) Manufacture of Hydrated Lime.

PERSONNEL.

(1) Mr. B. Rama Rau, M.A., D.I.C., Director of Geology in Mysore, (Convenor).

(2) Dr. H. S. Sharma, Ph.D. (Lond.), D.I.C. (Lond)., Chemist, Mysore Paper Mills, Ltd.

(3) Mr. V. Balakrishna, B.A., General Manager, Mysore Paper Mills, Ltd.

(4) Mr. G. Gundu Rao, M.Sc., A.I.I.Sc., Mysore Sugar Company, Ltd.

(5) Mr. M. M. Ganapati, Superintendent, Chemical Plant, Mysore Iron & Steel Works.

The Director of Industries and Commerce stated that the experimental batch of hydrated lime from kankary limestone was found by the Mysore Sugar Company to be as good as the imported variety.

The Chairman remarked that the Director of Geology might be requested to forward a detailed up-to-date report on the investigations *re* hydrated lime. It was also decided that the experiments should be continued at Bhadravati till definite results were obtained.

(3) Manufacture of Magnesite Bricks.

It was decided that as resolved in the last Board meeting further experiments might be conducted at the Porcelain Factory, when the tunnel kiln was ready and the Government Director, Industrial Concerns, be requested to take necessary action in the matter and send his report.

(4) Manufacture of Caustic Soda.

PERSONNEL.

(1) Mr. E. V. Ganapati Iyer, B.Sc., Government Director of Industrial Concerns, (Convenor)

(2) Mr. S. G. Sastry, B.A., M.Sc., (Lond.), Director of Sandalwood Oil Factory.

(3) Dr. B. K. Ram Prasad, M.A., (Hon.), D.Sc., M.I.E., Government Electrical Department.

(4) Dr. K. R. Krishnaswamy, B.A., D.Sc., F.I.C., Indian Institute of Science.

(5) Mr. B. Rama Rau, M.A., D.I.C., F.G.S., Director of Geology in Mysore.

The proceedings of the sub-committee were recorded. It was noted that the sub-committee had requested Dr. Krishnaswamy to draw up a scheme in consultation with Mr. S. G. Sastry, for the consideration of the sub-committee. It was decided to await the further report of the sub-committee.

(5) Manufacture of Graphite Electrodes and other Products.

PERSONNEL.

(1) Mr. D. V. Krishna Rao, B.A., Mysore Iron and Steel Works, (Convenor).

(2) Dr. B. K. Ram Prasad, M.A. (Hon.), D.Sc., M.I.E., Government Electrical Department.

(3) One Chemist from the Mysore Paper Mills, Ltd.

(4) One from the Indian Institute of Science.

The brief review of work done by the sub-committee was read out and the proceedings of the sub-committee were recorded. The scheme submitted by Mr. P. S. Narayana, Consulting Industrial Geologist, on the manufacture of Graphite products in the State (forwarded by Government) had been considered by the sub-committee which was of opinion that the scheme was superficial, wanting in details. The Board accepted the opinion of the sub-committee.

The Chairman, Mysore Iron and Steel Works, gave a brief account of the experiments conducted at Bhadravati re : Graphite Electrodes and said that the results of experiments were very encouraging. After discussion, the following resolutions were adopted :—

(1) that the experiments on Graphite Electrodes etc., at Bhadravati should be continued expeditiously.

(2) that the facilities required to continue the experiments might be given to the Officers of the Mysore Iron & Steel Works at the Government Electric Factory.

(6) Manufacture of Plastics.

PERSONNEL.

(1) Mr. V. Rama Rau, B. Sc., Government Electric Factory. (Convenor),

(2) Mr. Mohamadali, B.Sc., Mysore Iron & Steel Works.

(3) Mr. V. Paul, M.Sc., Mysore Iron & Steel Works.

(4) Mr. M. Srinivasaiya, B.A., F.I.I.Sc., Indian Institute of Science.

(5) Mr. S. G. Sastry, B.A., M.Sc. (Lond.), Director of Sandalwood Oil Factory.

The Chairman, Mysore Iron & Steel Works, gave a brief account of the work done at Bhadravati so for. He informed the members that the formaldehyde plant had since been erected, and the production of powder in the pilot plant was about 50 lbs. a day for the present.

The mouldings taken out from phenol formaldehyde powder recently manufactured at Bhadravati were then examined, and they were found to be satisfactory. The Chairman pointed out that phenol powders might be first perfected before taking up other compositions, and that the sub-committee should actively and promptly pursue the matter and also keep in touch with the experiments conducted at Bhadravati.

The question of the manufacture of plastics with shellac base was also considered. The Director, Sandalwood Oil Factory, explained that the scheme was not one of economic importance to the State, as quantities of raw materials such as Lac, wood-flour, etc., were not available locally. It was resolved to drop the subject.

(7) Manufacture of Potassium Permanganate.

PERSONNEL

(1) The Director of Geology (Member and Convenor).

(2) The Director of Sandalwood Oil Factory.

(3) The Government Director, Industrial Concerns.

(4) Dr. K. R. Krishnaswamy, B. A., D. Sc., F. I. C., Indian Institute of Science.

The report of Mr. L. S. Chandrakanta, Research Scholar of the Mysore Geological Department and the proceedings of the Committee were recorded. The Director, Sandalwood Oil Factory, stated that the Research Scholar had tackled the subject very well and the very approach of the subject was novel and instructive. The work of the Research Scholar was noted with satisfaction. The recommendation of the Committee to refer the scheme to the Government Bichromate Factory to take it up as an extension of work at a suitable opportunity was approved.

(8) Manufacture of Cement Asbestos.

PERSONNEL.

(1) Mr. B. Rama Rau, M.A., D.I.C., F.G.S., Director of Geology (Convenor).

(2) Mr. S. G. Sastry, B.A., M.Sc. (Lond.), Director of Sandalwood Oil Factory.

(3) Mr. M. K. Narasimhan, B.A., Cement Factory.

The Director of Sandalwood Oil Factory stated that he was taking action to dipsose of the existing stock of asbestos. The Chairman enquired if there was any scope for the manufacture of Boiler composition from asbestos and whether it would not thrive as small scale industry. The subject was discussed in detail. The question of adequate supplies of raw material—asbestos—came up and the Secretary invited the attention of the Board to the Administration Report of the Mysore Geological Department for the year 1938-39 where it was stated that in Idegondanahalli area, Hole-Narasipur taluk, 8,000 tons of asbestos had been located. It was considered desirable and necessary to utilise the raw material locally available to the best advantage.

The Chairman, Mysore Iron & Steel Works brought to the notice of the Board that the possibilities of manufacturing asbestos pipes might be examined, in view of the demand for military and other works.

It was finally resolved to request the sub-committee to examine the question of manufacture of Asbestos Boiler composition and also that of manufacture of asbestos cement pipes and favour the Board with its views.

(9) Manufacture of Abrasives.

PERSONNEL.

(1) The Director of Geology, (Member and Convenor).
(2) Dr. J. C. Ghosh, Director, Indian Institute of Science.
(3) Mr. P. S. Narayana, Cunsulting Industrial Geologist.
(4) The Government Director, Industrial Concerns.

Proceedings of the sub-committee and Government Orders No. D. 2908-11—I. & C. 230-40-8 dated 23rd December 1940 and No. D. 3468-69—I. & C. 230-40-16 dated 24th January 1941 sanctioning Rs. 2,000 and Rs. 500, respectively to Mr. P. S. Narayana, Consulting Industrial Geologist, on the recommendations of the Board, were read and recorded. The Director of Industries and Commerce pointed out that samples of abrasive articles prepared by Mr. Narayana were not satisfactory. The Chairman observed that the Director of Geology was in direct touch with Mr. Narayana and will report further on the progress of the investigations.

(10) Manufacture of Chemicals, Drugs and Essential Oils.

PERSONNEL.

(1) *Sastravaidyapravina* Dr. S. Subba Rao, B.A., M.B.C.M., L.R.C.P., D.P.H., (Chairman).
(2) Dr. B. T. Narayana, Agricultural Chemist.
(3) Mr. B. H. Krishna, Industrial and Testing Laboratory.
(4) Dr. B. L. Manjunath, Central College.
(5) Dr. P. C. Guha, Indian Institute of Science.
(6) Dr. L. S. Doraswami, Economic Botanist.
(7) Mr. M. S. Krishna Rao, Government Soap Factory.
(8) Dr. M. N. Ramaswamy, Forest Research Laboratory.
(9) Mr. B. Sanjeeva Rao, Indian Institute of Science.
(10) Mr. V. Venkatachar, Assistant Director of Industries and Commerce, (Secretary).

The report of the sub-committee was recorded. The Chairman remarked that the subject was a very important one and that necessary immediate action on the resolutions of the sub-committee might be taken and pursued.

The Director of Sandalwood Oil Factory said that Mr. Sundara Rao of Mysore—a gentleman with experience in the cultivation of essential oil plants—whom he consulted, was of opinion that the land of the Sandalwood Oil Factory at Mysore was not good for geranium cultivation. He also mentioned that Mr. B. V. Pandit of Nanjangud himself a large consumer of geranium oil, had imported cuttings from Yercaud and planted them at Nanjangud. At this stage the subject proposed by the Superintendent, Government Soap Factory, re: cultivation of patchouli and geranium in the factory (subject No. IV (E)) was also considered. The Chairman pointed out that the Forest and Agricultural Departments who are placed in a better position might be asked to take necessary

immediate action to grow the herbs and other essential oil bearing plants including patchouli and geranium as recommended by the sub-committee in their report placed for discussion, and the departments might also be requested to arrange if possible for the cultivation of these plants in an experimental plot at Balehonnur and Kemmangundi.

The Chairman also desired that Mr. S. G. Sastry, might be requested to publish a phamphlet *re*: Geranium containing full information with regard to its importance, etc., for being circulated and given publicity in the State.

The Chairman desired to know the progress with regard to Vitivert cultivation and called for a report.

(11) Production of Cinchona.

The report of the Chief Conservator of Forests and also that of Dr. M. N. Ramaswamy, Forest Research Chemist were placed before the House and recorded.

(12) Sulphur.

The report of the Director of Geology in Mysore was recorded.

(13) Manufacture of Urea.

PERSONNEL

(1) The Government Director of Industrial Concerns (Member and Convenor).
(2) The Director of Sandalwood Oil Factory.
(3) Dr. J. C. Ghosh, D.Sc. F.N.I. Director, Indian Institute of Science.
(4) Dr. V. Subrahmanyan, D.Sc., F.I.C., Indian Institute of Science, Bangalore.
(5) Dr. B. T. Narayanan, Agricultural Chemist.

The Chairman stated that a separate sub-committee was recently constituted to examine the possibilities of the manufacture of Urea.

The Director of Sandalwood Oil Factory explained the importance of Urea specially in plastics industry. He was of the opinion that a whole time chemist should be appointed to conduct experiments. It was pointed out that experiments had already been conducted at the Indian Institute of Science for conversion of compressed Ammonia into Urea and that Dr. Ghosh, Director of the Institute, would be glad to place the results before the committee subject to the conditions that might be laid down by the Government of India. The Chairman remarked that it was unnecessary to duplicate the work since the results of experiments at the Indian Institute of Science might be made available and the appointment of a whole time chemist was therefore not necessary. He, however, suggested that any-one of the chemists either at Belagola or at Bhadravati might be given facilities for experiments.

MISCELLANEOUS.

Utilisation of Molasses for the recovery of potash salts.

The reply received from the Secretary, Mysore Sugar Company, Ltd., was read. The Chairman observed that the question might be actively pursued and the Sugar Company requested to expedite their views in the matter.

The following subjects on the agenda were deferred for consideration at the next meeting for want of time.

(1) Compilation of information re: Industrial Researches in the State.
(2) Scope and Functions of the Research Board.
(3) Consideration of subjects proposed by:
  (*a*) Government Director, Industrial Concerns—Manufacture of glass bulbs, silk worm gut, etc.
  (*b*) Director of Industries and Commerce,—Suggesting that certain items of researches taken up by the Government of India may also be taken up here.
  (*c*) General Manager, Government Electric Factory. – Utilisation of steel shavings.
  (*d*) Manager, Mysore Spun Silk Mills, Ltd, Channapatna—Manufacture of bobbins, shuttles, etc., etc.,
  (*e*) Dr. A. V. Varadarajaiengar, B.A., D.Sc., A.I.E. Indian Institute of Science—Manufacture, of starch from sweet potato.

The Chairman thanked the members for their useful suggestions and the meeting terminated.

K. PARTHASARATHI,
Secretary.

N. MADHAVA RAU,
Chairman.

WD 1603—GPB—100—21-4-41.

I. R. B. 6]

SUBJECT Manufacture of Graphite Electrodes and other Products

Fine draft

No.

To Dr. V. Krishna Rao, Esq. B.A.
M. I. Sc.

Date of issue ..

Signed by ..

Sir,

I am directed to state that in the B.D. meeting held on 15/3/41, after perusing the work done by the Sub Committee, the following resolutions were adopted:-

1) That the expts on Graphite electrodes etc at Bhadrawati should be continued expeditiously.

2) That the facilities required to continue the expts might be given to the officers of the M. I. & S. at the E.F.

I am desired to
Ryt Hon'ble Kindly to
take necessary prompt
action on the Resolutions
& to keep the BSF informed
of the Progress from time to time

A Copy of the letter is
also forwarded to the
Chairman, M. & Ho
and Govt Dr of I.C
for favour of issuing
necessary instructions
to the Circns.

J.K.L
&
Secy

List of enclosure.

1) Copy W/c to Chairman, M. & Ho Rly,
favour of infmn & necessary action.

2) Copy W/c to Govt Dr I.C for favourable
a Ryt that necessary facilities may kindly be
~~arranged for at GFF, to~~ given to the Officers
Inspectg, at GFF to enable them to
Continue the exps expeditiously

Copied by
Examined by

&
Secy

WD 01343—GPB—750—4-1-41

7/11/41

567

4th April 1

D.V.Krishna Rao, Esq., B.A.,
Superintendent, Open Hearth Furnace,
Mysore Iron & Steel Works, and
Convenor, Graphite Electrodes
and other products Sub-Committee,
Bangalore.

Subject: Graphite electrodes and other products -
Manufacture of.

I am directed to state that in the Board meeting held on 15th March 1941, after reviewing the work done by the sub-committe the following resolutions were adopted:-

1) That the experiments on Graphite Electrodes etc., at Bhadravati should be continued expeditiously.

2) That the facilities required to continue the experiments might be given to the Officers of the Mysore Iron and Steel Works at the Government Electric Factory.

I am desired to request you kindly to take necessary prompt action on the resolutions and to keep the Board informed of the progress from time to time.

A copy of this letter is also forwarded to the Chairman, Mysore Iron and Steel Works and Government Director of Industrial Concerns, for favour of issuing necessary instructions to the Concerns.

I have the honor to be,
Sir,
Your most obedient servant,

sd. K.Parthasarathi.

HBR)

SECRETARY.

p.t.o.

568-1

1) Copy of the foegoing is forwarded with compliments to the Chairman, ~~xxxxxx~~ Mysore Iron and Steel Works, etc., Bangalore for favour information and necessary action.

2) Copy of the foregoing is forwarded with compliments to the Government Director of Industrial Concerns, Bangalore for favour of information, with a request that necessary facilities may kindly be given to the Officers of Mysore Iron and Steel Works, at the Government Electric Factory, to continue the experiments expeditiously.

K Santhanam

Secretary.

THE MYSORE IRON & STEEL WORKS

BHADRAVATI

8th April, 1941.

The Secretary,
Industrial Research Board,
Bangalore.

Dear Sir,

Graphite Electrodes.

I am in receipt of your letter No.567/40-1 dated the 4th instant informing me of the resolutions adopted at the recent meeting of the Board in regard to the investigations on the manufacture of Graphite Electrodes.

Larger sized transformers for which orders were placed some months ago, have just been received and further experiments will be started soon.

Yours faithfully,

Convenor,
Graphite Electrodes and other
Products Sub Committee.

INDUSTRIAL RESEARCH
No. 283
Date 11/4/41
BANGALORE

656/401

23rd May 1

Dr.B.K. Ram Prasad, M.A.,(Can),D.Sc.,M.I.E.,
Superintendent,
Power and Light,
Champion Reefs (K.G.F.)

Subject:Graphite Electrodes and Graphite products Sub-Committee.

Refce: This office memo No.398 dated 31-1-41.

I am directed to inform you that consequent on the transfer of Mr.D.V. Krishna Rao, Superintendent, Open Hearth Furnace, Mysore Iron and Steel Works, Bhadravati to Calcutta, you have been re-appointed as as the CONVENOR of the above Sub-Committee.

The Superintendent, Open Hearth Furnace, Mysore Iron and Steel Works, Bhadravati, will continue to serve the above Sub-Committee as a member vice Mr.D.V. Krishna Rao. The relavent records of the Sub-Committee may kindly be got from Bhadravati. Kindly acknowledge receipt of this letter.

I have the honor to be,
Sir,
Your most obedient servant,
sd/-

NP. 657-3/4601 -2-

1) Copy of the foregoing is forwarded with compliments to the Superintendent, Open Hearth Furnace, Mysore Iron and Steel Works, Bhadravati, for information and needful action.

2) Copies with compliments to Mr.D.V.Krishna Rao,B.A., c/o Mysore Iron and Steel Works,for information.

3) Copies with compliments to the General Manager, Mysore Iron and Steel Works, Bhadravati for information.

Secretary.

HSR)

DR. B. K. RAM PRASAD,
M.A. (HON.), D.SC., M.I.E., (IND.),
SUPERINTENDENT.

OFFICE OF THE SUPERINTENDENT
POWER AND LIGHTING.

D.O.No. 94

CHAMPION REEFS, 26th. May 1941.
(K.G.F.)

Dear Sir,

GRAPHITE ELECTRODES AND GRAPHITE PRODUCTS SUB-COMMITTEE....

I beg to acknowledge, with thanks, your letter No. 656/40-41 dated 23rd. May 1941, conveying the instructions of the Industrial Research Board, Bangalore, re: the Convenor-ship of Graphite Electrodes and Graphite Procucts Sub-Committee. I shall obtain the relative records from the Authorities ~~of~~ at Bhadravati.

Yours Sincerely,
BK Ram Prasad

To

K. Parthasarathi, Esq., B.A.,
Secretary, Industrial Research Board,
Government of Mysore - BANGALORE.

RP/BVS.

OFFICE OF THE SECRETARY INDUSTRIAL RESEARCH BOARD
No 339/40-1
Date 28/5/41
BANGALORE.

Note & File

28/5/41

P. S. NARAYAN,
CONSULTING ENGINEER & GEOLOGIST.

ENGINEERING & MINERAL INDUSTRIAL
RESEARCH LABORATORY,
"MINES HOUSE,"
MALLESWARAM P. O.,
BANGALORE.

D. K. H
7/10/41

20th. Oct.

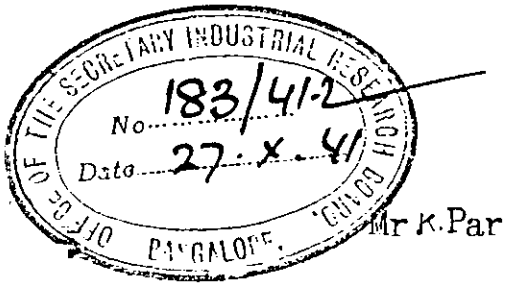
Dear Mr. Parthasarathy,

I am glad to inform you that the work on Graphite products and electrodes and bases for heaters, has also been taken up since one of the concerns in the line have approached me with their requirements and difficulties. I have been at it and I hope to inform you of the further developments in that direction soon,

27/X

Yours Sincerely,

P S Narayan



Mr K. Parthasarathy, B.A.

Secretary Industrial Research board,

Bangalore.

S. N. pulled.
Ok 30/x/41.

(Board of Industrial Planning and Coordination)

3rd November 1

508/41-2

Dear Dr.Ram Prasad,

Subject: Graphite Electrodes & other graphite products - Investigations.

I write to invite reference to this office letter No.567 dated 4th April 1941, communicating the decision of the Board.

I am desired to request you to kindly forward fortnightly reports on the progress of the investigations in consultation with the General Manager, Mysore Iron and Steel Works, for being placed at every meeting of the Board. In the first instance, a consolidated report on the investigations conducted from the beginning may kindly be forwarded for perusal of the Chairman.

Yours sincerely,

sd/-

Dr.B.K. Ram Prasad,M.A.,D.Sc.,M.I.E.,
General Superintendent,
Jog Project
Bangalore.

No. 509/41-2

Copy of the above is forwarded with compliments to the General Manager, Mysore Iron and Steel Works, for favour of information an d necessary action.

original signed (K.P.)
Secretary.

4/11/41

(Board of Industrial Planning and Coordination)

535

November 1

Dr.B.K. Ram Prasad, M.A., D.Sc., A.I.C.,
General Superintendent,
Jog Project, Bangalore.
(& Convenor, Graphite Electrodes Sub-Committee.)

Subject: Graphite Electrodes and other products.

In enclosing herewith a copy of letter dated 26th October 1941 received from Mr. . . Narayana, Consulting Industrial Geologist and Engineer, Malleswaram, on the above subject, I am directed to request you to be so good as to get into touch with Mr.Narayana and to forward a report for the information of the Board, as the work done by him

I have the honor to be,
Sir,
Your most obedient servant,
sd/

Secretary.

No. 536-1 ens

1) Copy of the foregoing is forwarded with compliments to the General Manager, Mysore Iron & Steel Works, Bhadravati for favour of information.

2) Copies to Mr.P.S. Narayana,B.A.,B.Sc., Consulting Industrial Geologist, "Mine House", Malleswaram, Bangalore for information with reference to his letter dated 26th October 1941.

Secretary.

(Board of Industrial Planning & Coordination)

534/42 16th November 1

Dear Mr.Narayana,

With reference to your letter dated 26th Octr.1941 re: Graphite Electrodes and other products I request you kindly to let me know the name of the Concern who have approached you for technical help and further developments in that direction.

Yours sincerely,

P.S. Narayana,Esq.,B.A.,B.Sc.,
Consulting Industrial Geologist,
"Mine House", 46 East Park Road,
Malleswaram, Bangalore.

D. O. No. 43

TELEPHONE No. 2110.
TELEGRAMS :—"GOMED"
OFFICE OF THE General Supdt.,
Jog Project,
BANGALORE, 8- XI- 1941
(S. INDIA)

Dear Mr. Parthasarathi,

Subject: Graphite Electrodes & Other Graphite Products - Investigations.

With reference to your D.O.No.508/41-2 dated 3rd Nov.'41 I wish to invite your kind reference to my D.O.No.37 dated 30th October 1941 forwarding the minutes of the Sub Committee on Graphite Electrodes regarding the progress of work done so far at the Mysore Iron & Steel Works.

Regarding the fortnightly reports, I am addressing the General Manager, Mysore Iron & Steel Works, to kindly furnish the progress of work every two weeks. In this connection, I wish to submit that the Officer-in-Charge of the Graphite Electrodes at Bhadravati intimated to me that the several aspects of the investigations have been partially delayed on account of War production work. However, the instruction of the Board will be conveyed to him for necessary further action.

Awaited

A consolidated report has also been called for, for being submitted to the Chairman.

Yours sincerely,
B.K. Ram Prasad
8/11/41

SECRETARY INDUSTRIAL RESEARCH BOARD
No. 222/41-2
Date 13/11/41
BANGALORE

13/11

K. Parthasarathi, Esq., B.A.,
Secretary,
Industrial Research Board,
Bangalore.

RP:MJA

P. S. NARAYANA
CONSULTING ENGINEER & GEOLOGIST.

ENGINEERING & MINERAL INDUSTRIAL
RESEARCH LABORATORY,
"MINES HOUSE,"
MALLESWARAM P. O.,
BANGALORE.

10th.Nov'41.

Dear Mr.Parthasarathi,

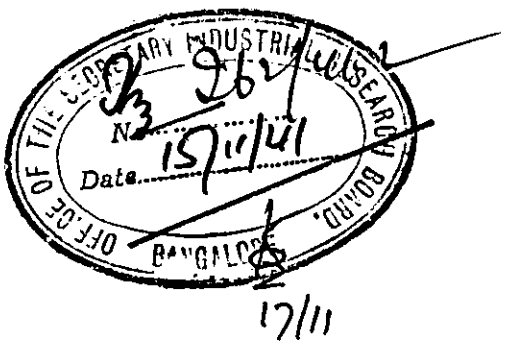
Ref.- Your D.O. No534 dated 10thNov '41.

It is Messers 'The Universal Electric CO, Engineers and Contractors , Basavangudi P.O ,who approached me for help.

Yours Sincerely,

P.S. Narayana

K.Parthasarathi,Esq.,B.A.,
Secretary,
Board of Industrial ~~RXXXXXXXX~~ Planning & Co-Ordination.
Govt.of Mysore,
BANGALORE .



17/11

BOARD OF INDUSTRIAL PLANNING & CO-ORDINATION.

Copy of letter d/ ... from The Universal Electric Co., Engineers & Contractors, Basavangudi P.O. Bangalore to Mr. P.S. Narayana, Consulting Engineer & Geologist, Malleswaram P.O., Bangalore.

We will be highly thankful if you can kindly manufacture and supply us the carbon and graphite plates as per samples sent, used on 220 volts, 25 to 60 cycles with the maximum of 50 amps.

Since we are very much handicapped in our work for want of these plates, we request you to kindly bestow your immediate attention.

Also we will be sending you the samples of carbons for Cenema arc lamps.

Thanking you,

For the Universal Electric Co.,
Sd/-.....

Copy of letter d/..... from the Universal Electric Co., Bangalore, to Mr. P.S. Narayana, Bangalore.

We are herewith sending you a sample of the base brick for mounting the heating element (Nichrome wire) used in a luminate factory.

We will be thankful if you could kindly supply us seven dozen of the bricks as per sample.

Since the Factory will be held up for want of these bricks, we would consider a great favour if you can give the bricks at your earliest.

Thanking you,

For the Universal Electric Co.,
Sd/-.....

Copy of letter d/..... from The Universal Electric Co., Bangalore, to Mr. P.S. Narayana, Bangalore.

We request you to kindly send us the samples of the Abrasives you are manufacturing with their costs.

Since we intend marketing these products, we will be highly thankful for all the facilities you could give us.

Thanking you,

For the Universal Electric Co.,
Sd/.....

Bangalore,
HSK. D/14-11-41. Secretary, B.I.P.C.

From

The Secretary to the Government of his Highness the
Maharaja of Mysore,
Development Department.

To

The Deputy Secretary to the Government of India,
Department of Commerce, New Delhi.

Sir,

With reference to your letter dated 9th September 1941 requesting that Professor Aston of the Indian Institute of Science, Bangalore, may be allowed to use the generator available in the Government Electric Factory in connection with his experiments for the manufacture of carbon electrodes for the aluminium Factory, I am directed to state that Professor Aston who got into touch with the Government Director, Industrial Concerns has since intimated that he is trying to modify an old machine to suit his requirements and that he will not say anything further in the matter till the experiments are completed.

I enclose for your information, copy of his letter to the Government Director, Industrial Concerns.

I have the honour to be,
Sir,
Your most obedient Servant,
Sd. V. Vedavyasacharya,
Secretary to Government,
Development Department.

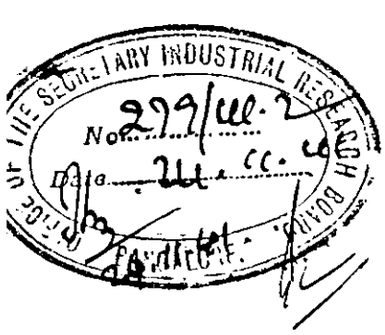
Memo No. 2558-59

Bangalore, Dated 19th November 1941.

Copy of the above is forwarded, with compliments to the Government Director, Industrial Concerns, with reference to correspondence ending with his U.O. Note No. 5235 dated 6th November 1941.

Sd. George Mathan,
for Secretary to Government,
Development Department.

(True Copy)



No. Copy forwarded with compliments to the Secretary, The Board of Industrial Planning and Co-ordination, Bangalore.

A. Anantha Krishnan.
for General Manager,
GOVERNMENT ELECTRIC FACTORY.

Bangalore,
21/11/'41.
cbr.

BOARD OF INDUSTRIAL PLANNING & CO-ORDINATION.

The following is the proceedings of the Graphite Sub-committee Meeting held at 2-30 P.M. on Monday the 27th October, 1941, at Bhadravati.

Mr. H.K. Ramanujam was co-opted and voted to the Chair by the Committee Members.

Members present.-

1. Mr. N. K. Seshadri Iyengar,
   Superintendent, Pulp Section,
   Mysore Paper Mills, Bhadravati.

2. Mr. H.S. Sastry,
   Superintendent-in-charge of
   Steel Foundry, Mysore Iron & Steel
   Works, Bhadravati.

3. Dr. Ramprasad,
   General Superintendent, Jog Project,
   Camp: Bhadravati. CONVENOR.

Original Proceedings sent by the Chairman to do Chairman. He is no for after, after meeting on 17.11.41

1. Reference from the Industrial Research Board regarding manufacture of Electrolytic cells. -

The Secretary, Industrial Research Board, has referred the question of manufacture of such of those electrolytic cells which Mysore Industries require and for which there is a definite demand. There are two types of these cells that are used in the Mysore Industries.-

(a) The Alkali chlorine cells used by the Mysore Paper Mills, Ltd., Bhadravati.

(b) The Hydrogen cells used by the Mysore Chemicals and Fertilisers, Ltd., Mysore and the Mysore Vegetable Oil Products, Ltd., Bangalore City.

The latter type may be required by the new oil Producing Industries that are working and that are likely to be started, such as the Davangere Vegetable Oil Products, Ltd., etc. As the investigation of the Hydrogen cells can better be carried out at the Mysore Chemicals and Fertilisers, Ltd., Belagula, where the Engineers in charge know the various requirements for the cell and the conditions of its working, the Committee is

contd.

of opinion that the Management of the Mysore Chemicals and Fertilisers, Ltd., be requested to examine this question in detail. The Paper Mills and the Mysore Iron & Steel Works will give all the necessary help for the above and Government Electric Factory may also be requested to arrange for supply of welded tanks and other minor requirements.

Alkali Chlorine Cell.- The Mysore Paper Mills and the Mysore Iron and Steel Works, are in a position to construct the chlorine caustic cells of small capacity on demand for consumers. The necessity for suitable graphite electrodes is keenly felt and the question is being investigated by the Mysore Iron & Steel Works. Since the Graphite Electrodes made from natural graphite by the Mysore Iron and Steel Works did not give the expected results, the question of making electrodes by the graphitisation of carbon is being conducted by the Works. The making of the Asbestos diaphragm required for the cells is being investigated by the Mysore Paper Mills, Ltd.,

2) Experiments and natural graphite.- Different types of electrodes were made at the Iron and Steel Works for the 1/2 ton Heroult furnace and a 1/2 cwt. Hoskin's furnace, and have enabled the Works to keep these furnaces in regular service by means of locally manufactured electrodes. The results are so far satisfactory. Attempts are being made to improve the quality of the products.

While manufacturing manganese steel castings, difficulties were experienced with ordinary stopper heads and nozzles supplied by outside Agencies. The Mysore Iron and Steel Works, took this work in hand and made a few stopper heads and nozzles out of locally produced graphite. These have given satisfactory results. Further experiments are being conducted.

3. Experiments with petroleum coke.- A suitable furnace of 100 KVA. has been built locally to graphitise rods, clubs and other parts made out of petroleum coke. A furnace transformer of 100 KVA had been put

contd.

in service for this furnace. The maximum size of rod so far made is 5" in diameter and 24" in length. The experiments connected with graphitisation of these coke electrodes have just been commenced and it will take some time to obtain sufficient data to place before the Committee. A report showing details and quality of products will be placed before the next Committee Meeting.

Electrode Plant. - The Mysore Iron and Steel Works, are installing a number of electric furnaces and there are other Industries which require graphite electrodes. The Committee feel it desirable to obtain quotations for a small electrode plant to manufacture all types of Electrodes and meet the local demand.

Sd/- H.K. Ramanujam.
CHAIRMAN.

Sd/- B.K. Ram Prasad.
CONVENOR.

Bhadravati,
28th October 1941.

"Copy"

Bangalore,
D/13-11-41.
HSK.

Secretary, B.I.P.C.

BOARD OF INDUSTRIAL PLANNING & CO-ORDINATION.

The following is the proceedings of the Graphite Sub-committee Meeting held at 2-30 P.M. on Monday the 27th October, 1941, at Bhadravati.

Mr. H.K. Ramanujam was co-opted and voted to the Chair by the Committee Members.

Members present.-

1. Mr. N. K. Seshadri Iyengar,
   Superintendent, Pulp Section,
   Mysore Paper Mills, Bhadravati.

2. Mr. H.S. Sastry,
   Superintendent-in-charge of
   Steel Foundry, Mysore Iron & Steel
   Works, Bhadravati.

3. Dr. Ramprasad,
   General Superintendent, Jog Project,
   Camp: Bhadravati. CONVENOR.

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contd.

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contd.

(Board of Industrial Planning and Coordination)

29 November 1

662

XXXXXXXXXXXXXXXXXXXXXXXXX

The

The Chairman
Mysore Iron and Steel Works etc.,
Bangalore.

I am directed to note below an extract from the proceedings of the Board meeting held on the 17th instant for favour of information and further action.

"Electrode Plant: The Chairman Mysore Iron and Steel Works stated the Mysore Iron and Steel Works is taking necessary action as suggested by Graphite Electrodes Sub-Committee.

I have the honor to be,
Sir,
Your most obedient servant,

Secretary

TELEGRAMS :- "GOMED"

TELEPHONE NO. { OFFICE : 2417 / RESIDENCE : 2537

B. K. RAM PRASAD, M.A., (HON.) D.SC., M.I.E. (IND.)
GENERAL SUPERINTENDENT

OFFICE OF THE GENERAL SUPERINTENDENT
JOG PROJECT.

D. O. No. 66
Encl: One Stt.

BANGALORE 24th December 1941
(S. INDIA)

Dear Sir,

With reference to your letter No.508 dated 3rd November, I wish to enclose herewith a copy of statement showing the experiments conducted on graphite electrodes at Bhadravati, for your kind information.

I must say in this connection that investigations were first started using natural graphite to meet the urgent requirements of the Paper Mills. However, as these electrodes were not found as satisfactory as the original Acheson graphite electrodes, further experiments were conducted by using petroleum coke and graphatising it in an electric furnace. They were able to produce electrodes which could be satisfactorily used in a furnace, but not suitable for alkali chlorine cells. The press for compressing the graphite in the mould does not give adequate pressure and they are trying to design a heavier press.

Further experiments are being conducted and fortnightly reports have been called for.

SECRETARY.
BOARD OF INDUSTRIAL
PLANNING & COORDINATION.
DEC 26 1941

Yours sincerely,
B K Ram Prasad
23/12/41

K. Parthasarathi, Esq. B.A.,
Secretary,
Industrial Research Board,
Bangalore.

THE MYSORE IRON AND STEEL WORKS,
BHADRAVATI.

A consolidated Report of Experiments conducted on Investigations of Graphite Electrodes at Bhadravati.

A number of experiments were conducted with petroleum coke and cocoanut charcoal; and the results with cocoanut charcoal were disappointing. And herein a few of the successful results of experiments with petroleum coke have been given.

No.	Date.	No. of hours on power.	Quantity of charge.	Kilowatt hours consumed.	Specific resistance in ohms.	Remarks.
1.	27-4-40	186 hrs. 30 min.	100 lbs.	3000 K.W.hrs.	.0083/ Cubic inches	30 Units/per
2.	8-5-40	225 " 25 "	90 "	3345 "	.0088/ do	37.1 do
3	18-5-40	332 "	94 "	3750 "	.0084 do	39.9 do
4.	1-6-40	400 "	180 "	320 "	.0086 do	24.0 do
5.	9-6-40	424 "	176 "	370 "	.0099 do	24.8 do
6.	15-6-40	403 "	200 "	700 "	.0082 do	13.5 do
7.	23-7-40	362 "	75 "	270 "	.0033 do	30.2 do
8.	16-8-40	530 "	60 "	300 "	.0023 do	55.0 do

Though the specific resistance values were satisfactory, the slabs and rods made out of petroleum coke left many cracks in the graphitised samples making them useless for service immediately. They were powdered and issued as graphite to the shops.

Bhadravati,
19-11-41.

Sd/- H. Srinivasa Sastri,
Officer in charge,
Electrode investigation.

RP-MJA.
22-12-41.

BK Rama Prasad
General Superintendent,
Jog Project.

Telephone No. 2417

IN REPLY REFER TO No. 478 ENCLO.

Telegraphic Address "GOMED"

SECRETARY. BOARD OF INDUSTRIAL PLANNING & COORDINATION. AUG 1 1942 No 67

GOVERNMENT OF MYSORE
ELECTRICAL DEPARTMENT.

OFFICE OF THE GENERAL SUPERINTENDENT.
JOG PROJECT,
United India Buildings,
Bangalore, City, 30th July 194
(MYSORE, S. INDIA.)

The Secretary,
Board of Industrial Planning & Co-ordination,
General & Revenue Secretariat,
Bangalore.

Dear Sir,

Graphite Electrodes.

With reference to your letter No. I.P. 52-6/42-3 dated 23rd July 1942, I wish to inform you that I personally visited Bhadravathi on the 29th instant and discussed the matter of a report for 1941-42 on Graphite Electrodes with the staff who are conducting investigations and requested them to send me details for submission of a report, which I expect to submit very shortly.

I was informed by the Graphite Investigators, who are carrying out experiments that a few modifications are being tried such as the use of iron oxide, sodium silicate and similar materials for binding raw material before graphitising.

In this connection, I beg to invite your kind reference to the proceedings of the committee meeting held on 27th October '41 submitted with my D.O.No. 37 dated 31-10-'41, in the last paragraph of which it is mentioned that it is desirable to obtain quotations for a small electrode plant to manufacture all types of electrodes. I beg to submit that further experiments on the graphite work will be greatly facilitated if a suitable high pressure press could be supplied for pressing carbon and other materials required in the process. If approved, quotations will be called for supplying such a press and the Mysore Iron & Steel Works, will also be requested to give us an estimate for making such a press, if possible.

Yours faithfully,

B K Rama Rao
30/7/42
Convenor, Graphite Electrodes, Sub Committee.

THE MYSORE IRON & STEEL WORKS
BHADRAVATI

SECRETARY
BOARD OF INDL
PLANNING & COORDINATION
AUG 10 1942
No. 83.

G/739. 7th August 1942.

Dr. B. K. Ram Prasad, M.A.(Hons.), D.Sc., M.I.E.(Ind.),
General Superintendent,
Jog Project,
BANGALORE CITY.

Dear Sir,

Subject:- Graphite Electrodes and other Graphite Products investigations.

As desired in your D. O. letter No.44 of 25/27th July 1942, we enclose herewith a note on Graphite Electrodes prepared by our Mr. H. Srinivasa Sastry, showing the work done during the year 1941-42.

Yours faithfully,
for THE MYSORE IRON & STEEL WORKS,

Sd/— B. Viswanath.
General Manager.

Copy forwarded with compliments to the Secretary, Industrial Planning and Co-Ordination, General and Revenue Secretariat, Bangalore, together with a copy of the note for information.

Encl:1

Copy of the note kept in Annual Report file.

18/8/42

BSL:

General Manager.

TELEGRAMS :- "GOMED"

TELEPHONE No. { OFFICE : 2417
RESIDENCE : 2537

B. K. RAM PRASAD, M.A., (HON.) D.SC., M.I.E. (IND.)
GENERAL SUPERINTENDENT

OFFICE OF THE GENERAL SUPERINTENDENT
JOG PROJECT,
United India Buildings,
BANGALORE City. 11th August 1942
(S. INDIA)

D. O. No. 46- Encl 2

SECRETARY.
BOARD OF INDUSTRIAL
PLANNING & COORDINATION.
AUG 13 1942
No. 91

Dear Sir,

GRAPHITE ELECTRODES

In continuation of my letter No.478-480 dated 30th July 1942, I wish to enclose herewith a copy of letter No.G/739 dated 7th August 1942 from the General Manager, The Mysore Iron & Steel Works, Bhadravati, enclosing a note on Graphite Electrodes prepared by Mr. H. Srinivasa Sastry.

Yours sincerely,
B K Ram Prasad
11/8/42

The Secretary,
Board of Industrial Planning &
Co-ordination, General & Revenue Secretariat,
BANGALORE.

RP:MJA

Letter No.G/739 dated 7th August 1942 from the General Manager, The Mysore Iron & Steel Works, Bhadravati.

Subject: Graphite Electrodes and other Graphite Products investigations.

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"COPY"

11/8/42

NOTE ON GRAPHITE ELECTRODES

Petroleum Coke was mixed with suitable proportion of coal tar and coal-tar pitch and pressed into electrodes 5 1/8 inch diameter and twenty inches long at a pressure of 180 tons and graphitised in the furnace suitably designed for the purpose. Several experiments were tried. The specific resistance compares very favourably with the specific resistance of Acheson graphite electrodes received from America.

No.	Specific Resistance
1	.000528
2	.000157
3	.00029
4	.00026

Though the electrodes were graphitised satisfactorily, the electrodes were found cracked all over, hence unsuitable for immediate use as electrodes. We have found two important defects in our experiments, one of which is the cracking all over of the electrode, making it unfit for use immediately as such and another is very high consumption of power per pound graphitised. In order to remedy these defects, we have to use suitable binding material for the electrodes. Scale and water glass are suggested and further experiments will be tried using suitable proportions of the above. In order to minimise the power consumption, the furnace will have to be redesigned and it is engaging attention. Investigations however cannot be carried on until magnesite bricks are available in large quantity so that requirements for steel making are not prejudiced.

Sd/ H.S. Sastry
5-8-1942.

COPY

11/8/42

Copy of letter No.B.79 dated 6th August 1942 from the Secretary, Board of Management, Mysore Iron & Steel Works, Bhadravati to the Secretary to Government, Development Department, Bangalore.

====

As desired in your D.O.letter No.D.815 dated the 24th July 1942, I enclose herewith a note detailing the present position on the manufacture of Carbon and Graphite Electrodes and of Calcium Carbide at the Works.

===

Note on the manufacture of Carbon and Graphite Electrodes and Calcium Carbide at the Works.

--

We very much regret we have absolutely no idea of research work that is being done in the Department of Electrical Technology in the Indian Institute of Science for the last eighteen months. Some investigations were made on the Works on a small scale and useful graphite was manufactured successfully and issued to plant use. We had difficulties in getting the graphite in the form of Electrodes as cracks developed during baking and graphitising. Further investigations have to be made shortly with suitable bonding material. The progress of work is not up to expectations as the Works could not obtain an extrusion press.

Regarding the manufacture of Calcium Carbide a few experiments were conducted in the Graphitising Furnace on the Works and there is not much to report on this subject.

sd. B. Viswantha.
General Manager, M.I.S.W.

"Copy"

Bhamana.

I. R. B. 6]

SUBJECT Manufacture of Graphite Electrodes & other Products - Expl investigations

No.

To The General Manager, M. I. Co Bhadrawati

Date of issue 24/8 Encl 1 dtd 22/8/42

Signed by 24/8

SIR,

I am directed to send herein enclosed a copy of letter No. 478 dated 30.7.42 received from Dr. B.K. Ramprasad Convener, Graphite Electrodes Sub Committee and to request you to kindly forward an estimate for manufacturing the High Pressure ~~Pumps~~ Press referred to in the last Para of the letter. The Probable

Time Extension to make the Press regarding be intimated

An early Compliance is requested.

Sd.

To M.S.W.

Sec'y

Copy of this above is forwarded to Dr. P.V. Ramprasad, Convener Graphite Electrodes Sub-Committee for info. with ref to his letter No. nil dated 30.7.12

List of enclosure.

To M.S.W.

Sec'y

24/8/12

Copied by

Examined by

I.P. 104/42-3

26th August 1942

The General Manager, Mysore Iron and Steel Works,
Bhadravati.

Sub: Manufacture Graphite Electrodes and other products - experimental investigations.

I am directed to send herein enclosed a copy of letter No.478 dated 30th July 1942, received from Dr.B.K.Ram Prasad, Convenor, Graphite Electrodes Sub-Committee and to request you to kindly forward an estimate for manufacturing the high pressure press referred to in the last para of the letter. The probable time required to make the press may also be intimated.

An early compliance is requested.

I have the honor to be,
Sir,
Your most obedient servant,

sd.T. Shamanna.

Secretary.

p.t.o.

No.I.P. 105/42-3 Dated 26th August 1942.

Copy of the foregoing is forwarded with compliments to Dr.B.K. Ram Prasad, Convenor, Graphite Electrodes Sub-Committee for information with reference to his letter No.478 dated 30th July 1942.

Secretary.

THE MYSORE IRON & STEEL WORKS
BHADRAVATI

SECRETARY
BOARD OF INDUSTRIAL
PLANNING & COORDINATION.
SEP 4 1942
No. 113

G/

31st August, 1942.

Dr. B. K. Ram Prasad, M.A.(Hons) D.Sc. M.I.E.(Ind.)
Convenor, Graphite Electrode Sub Committee and General Superintendent,
Jog Project, B A N G A L O R E.

Dear Sir,

Subject: Manufacture of Graphite Electrodes and other products - experimental investigations.

The Secretary, Board of Industrial Planning and Co-ordination has, in his letter No.104/42-3 of the 26th instant requested us to forward an estimate for manufacturing the High Pressure press referred to in the last para of your letter No.478 dated 30th July 1942 addressed to him on the above subject. We shall be glad if you will kindly furnish us the detailed specification of the press to take further action in the matter.

Thanking you,

Yours faithfully,
for The Mysore Iron and Steel Works:

General Manager.

Copy forwarded with compliments to the Secretary, Board of Industrial Planning and Co-ordination, Bangalore with reference to his letter No.104/42-3 dated 26th August 1942.

avr:

General Manager.

I.P. 271/42-3. 4th November 1942.

The General Manager, Mysore Iron & Steel Works, Shadravati.

Subject: Manufacture of Graphite Electrodes and other products - experimental investigations

****

In inviting kind reference to your letter No.G.1036 dated 31st August 1942, on the subject, I am directed to request you to be so good as to expedite the forwardal of the estimate requested for.

I have etc.,

sd.T. Shamanna.
Secretary.

No.I.P. 272/42-3.

Copy of the above is forwarded with compliments to Dr.B.K. Ram Prasad,M.A.,D.Sc., General Superintendent Jog Project, Bangalore for information with reference to the letter of the Iron Works addressed to him, with a request to kindly expedite the furnishing of

furnishing the specifications to the Iron Works, if not already done.

6/4/42

Secretary.

2256

Telephone No. XXXX

IN REPLY REFER TO No. 1672 ENCLO

SECRETARY. BOARD OF INDUSTRIAL PLANNING & COORDINATION. NOV 11 1942 No. 165

Telegraphic Address "XXXXXX GOMED"

GOVERNMENT OF MYSORE
ELECTRICAL DEPARTMENT.

OFFICE OF THE GENERAL SUPERINTENDENT,
JOG XXXXXX Power Scheme,
Bangalore, City 10th November 1942
(MYSORE, S. INDIA.)

The Secretary,
Board of Industrial Planning & Co-ordination,
General & Revenue Secretariat,
B a n g a l o r e.

S i r,

Manufacture of Graphite Electrodes and other products- experimental investigations.

With reference to your Memo No. 272 dated the 4th instant, I have the honour to inform you that I discussed this matter with Mr. D.V.Krishna Rao of the Mysore Iron & Steel Works and arrangements are being made to send up the estimates for the Press required to manufacture graphites.

I have the honour to be,
S i r,
Your most obedient servant,

B K Ram Prasad

General Superintendent,
Jog Power Scheme. 10/11/42

I.P.391

17th December 1942.

The General Manager, Mysore Iron & Steel Works,
Bhadravati.

Subject: Manufacture of Graphite Electrodes etc - Investigations.

+++

I am directed to invite kind reference to letter No. I.P.271/42-3 dated the 4th November 1942, on the above subject and to request that the estimates may be sent very early.

I have the honor to be,
Sir,
Your most obedient servant,

sd. T. Shamanna.

Secretary.

No.I.P.392/42-3

Copy of the above is forwarded with compliments to Dr.B.K.Ram Prasad, General Superintendent, Jog Project with reference to his letter No.1672 dated 10th Novr.1942 with a request to expedite matters.

Secretary. 16/12/42

December 1942.

I.P.

The General Manager, Mysore Iron and Steel Works,
Bangalore.

Mr.T.Shamanna,M.A.,

D.O.291/43-44 11th March 1944.

Dear Sir,

Subject:Manufacture of Graphite Electrodes - Sub-Committee.

+++

I am desired to request you to be so good as to immediately forward a short note on the work done by the sub-committees, the number of meetings held during the year 1942-43 and the current year and also to furnish your views as to whether this sub-committee may not be dissolved.

The matter may kindly be treated as urgent.

Yours sincerely,

Dr.B.K. Ram Prasad,D.Sc.,M.I.E.,
General Superintendent,
Jog Power Scheme,
Bangalore.

D.O. 307.

B.K.R.Prasad,M.A.(Hon) D.Sc.,
M.I.E. (Ind) A.M.I.E.E.,
General Superintendent,

D.P-234 BD of Sc & IR To 3/4/1944

Office of the Genl. Supdt.,
Jog Power Scheme,
JOG, 30th March 1944.

Dear Sir,

Subject: Manufacture of Graphite Electrodes
- Sub Committee.

With reference to your D.O.No. I.P.291/43-44 dated 11th March 1944, I wish to inform you that I have requested the General Manager, Mysore Iron & Steel Works to send a short note on the work done on the manufacture of Graphite Electrodes for your kind information, as all the works are carried out in the Metallurgical -- Department at Bhadravati.

During 1942-43, on various occasions, I visited Iron & Steel Works, Bhadravati and discussed the matter on experimental works on graphite electrodes. From -- March 1943 to October 1943, I was away on deputation. After my return, I was given to understand that the work on graphite electrodes was proposed to be taken up after the urgent works in the steel foundry were completed.

In this connection, I beg to state that it would be desirable to provide necessary facilities to the Officer who is conducting the investigations at Bhadravati with an Assistant, if necessary. They are also in need of a suitable extrusion press to prepare the material for the final product.

Yours sincerely,
BKPrasad

T.Shamanna Esq., M.A.,
Secretary, Board of Scientific
& Industrial Research,
Bangalore.

I.P.

21st April 1944.

The General Manager, Mysore Iron & Steel Works,
Bhadravati.

Subject: Manufacture of Graphite Electrodes etc.

+++

I am directed to state that Dr.B.K.Ram Prasad, Convener of the Graphite Electrodes sub-committee has reported that he has requested ~~to~~ you to send a short note on the work done on the above subject at Bhadravati. I am to request you to kindly expedite the forwardal of this note and also to intimate the present stage of the investigation, the work that is ahead and other details. Dr.Ram Prasad has also suggested that it would be desirable to provide necessary facilities to the Officer who is conducting the investigations at Bhadravati with an Assistant if necessary and that the works is in need of a suitable extrusion press to prepare the material for the final product. I am to request you to kindly indic te your views in the matter and the action you propose to take in the matter.

The favour of an early reply is requested.

I have etc.,

sd.T. Shamanna.
Secretary.

Dr.337
21-4-44

Copy of the above is forwarded with compliments to Dr.B.K.Ram Prasad, General Superintendent, J.P.S. Jog for information and further action with reference to his letter No.307 dated the 30th March 1944.

Secretary.

Telegrams :- " GENJOG "

Telephone No. { OFFICE: 2417
RESIDENCE: 2537

B. K RAM PRASAD, M.A., (Hon.), D.Sc.,
M.I.E. (Ind.), A.M.I.E.E.,
GENERAL SUPERINTENDENT.

OFFICE OF THE GENERAL SUPERINTENDENT,
JOG POWER SCHEME,
Jog,
(S. INDIA)

D. O. No. ~~5237~~ 335

B.S. 242/24/4

21 April 1944

Dear Sir,

BSR
XX
29/4/44

Manufacture of Graphite Electrodes.

In continuation of my letter D.O. 307 dated 30-3-'44, I wish to inform you that I had a discussion with the authorities of the Mysore Iron & Steel Works, on the matter of manufacture of carbide and I have been intimated that active efforts are being done to take up the work and suitable proposals are under submission for the necessary equipment and staff required.

It is very desirable that an Assistant is posted who could devote his attention entirely on this work at Bhadravati and suitable equipment and raw materials etc., are provided.

I wish to enclose herewith a note prepared by the works manager Metallurgical Division, for your kind information.

Yours sincerely,

B K. R Prasad

T.Shamanna, Esq., M.A.,
Secretary,
Board of Scientific & Industrial Research,
Bangalore.

Note on the work done on Graphite electrodes.

-------by Mr D.I Jeeshna Rao works manager.

Continuous work on this investigation was stopped sometime about the end of 1941, the main reason being that the staff engaged on the investigation work had other pressing work in connection with the manufacture of steel castings and special steels.

The results of investigation carried so far after two 50 KVA transformers were installed, indicate that with the help of standard equipment, graphite of a required quality could be satisfactorily manufactured from petroleum coke.

Another important aspect of the experiments which the staff at Bhadravati had set before themselves was to investigate how far local materials like cocoanut shell charcoal or other equally pure carbonaceous material could be converted into graphite. So far very little work could be done inthis direction, and if the trials have to continue, it should bein this direction.

There is no doubt that graphite electrodes of fairly large dimensions can successfully be made by installing suitable standard equipment provided regular supplies of petroleum coke are ensured. But it has to be considered whether an industry can be said to be satisfactorily established if it has to depend upon outside sources for its main raw material. Whether a mixture of some pure carbonaceous fuel locally available, and petroleum coke can be successfully converted into graphite, has to be decided only after a series of trials.

Before dissolving the sub committee, it may therefore be desirable to obtain someconclusive data on the possibility of graphitising cocoanut shell charcoal alone or in mixture with petroleum coke. But for this purpose it will be necessary to get a special grant for meeting various items of expenditure necessary for carrying on the investigation. It may be mentioned here that a considerable sum of money was spent out of the Iron & Steel Works Budget for the earlier experiments. An approximate estimate of expenditure required for the continuous investigation is noted below:

One technically trained Graduate on Rs.80/- P.M.	Rs. 80/- P.M.	
Two men: 1 on Rs.1/4/0 a day and the second on Re.0/12/0 a day or say Rs.2/- a day (26 days)	Rs. 52/- P.M.	
Power charges at Re.0/0/6 per K.W.H. L.S.	Rs 600/- P.M.	(if the graphatising
Charcoal & coke.	Rs. 60/- P.M.	furnace runs for about 15
Refractories & other spare materials.	Rs. 60/- P.M.	days in the month)
Pressing & other mechanical work.	Rs.100/- P.M.	
	Rs.952/- P.M.	
or say	Rs.1,000/- P.M.	

The experimental work may last for a period of about six months. If a grant as required above is sanctioned, it would be possible to conduct further trials.

THE MYSORE IRON & STEEL WORKS
(GOVERNMENT OF MYSORE)

Telegraphic Address :
"MYSIRON" BHADRAVATI
Codes :
BENTLEY'S
WESTERN UNION FIVE LETTER
A. B. C. 6th EDITION

BHADRAVATI
(MYSORE STATE RAILWAY)
India

Ref. G/ 66:3

27th April 1944.

The Secretary,
Board of Scientific & Industrial Research,
Bangalore.

Dear Sir,

Subject: Manufacture of Graphite Electrodes etc.

With reference to your letter No.I.P.336/43-44 dated 21st April 1944 on the above subject, I write to inform you that I have already sent a Note on the manufacture of Graphite Electrodes prepared by Mr. D.V. Krishna Rao, Works Manager, Metallurgical Division, to Dr. B.K. Ram Prasad, General Superintendent, Jog Power Scheme, and Convener of the Graphite Electrodes Sub Committee, Jog, with my letter No.G/6305 dated 13th April 1944. A spare copy of this Note was also given to Dr. Ram Prasad in person at Bhadravati on the 17th idem. I enclose for your information a copy of the Note.

BOARD OF SCIENTIFIC AND INDUSTRIAL RESEARCH.
MAY 1 1944
I.P. 247 No.

Yours faithfully,

General Manager.

Encl: 1 Note.

crs.

THE MYSORE IRON & STEEL WORKS
BHADRAVATI

Note on the work done on Graphite Electrodes.

Continuous work on this investigation was stopped sometime about the end of 1941, the main reason being that the staff engaged on the investigation work had other pressing work in connection with the manufacture of steel castings and special steels.

The results of investigation carried so far after two 50 KVA transformers were installed, indicate that with the help of standard equipment, graphite of a required quality could be satisfactorily manufactured from petroleum coke.

Another important aspect of the experiments which the staff at Bhadravati had set before themselves was to investigate how far local materials like cocoanut shell charcoal or other equally pure carbonaceous material could be converted into graphite. So far very little work could be done in this direction, and if the trials have to continue, it should be in this direction.

There is no doubt that graphite electrodes of fairly large dimensions can successfully be made by installing suitable standard equipment provided regular supplies of petroleum coke are ensured. But it has to be considered whether an industry can be said to be satisfactorily established if it has to depend upon outside sources for its main raw material. Whether a mixture of some pure carbonaceous fuel locally available, and petroleum can be successfully converted into graphite, has to be decided only after a series of trials.

Before dissolving the Sub-committee, it may therefore be desirable to obtain some conclusive data on the possibility of graphitising

cocoanut shell charcoal alone or a mixture with petroleum coke. But for this purpose it will be necessary to get a special grant for meeting various items of expenditure necessary for carrying on the investigation. It may be mentioned here that a considerable sum of money was spent out of the Iron & Steel Works budget for the earlier experiments. An approximate estimate of expenditure required for the continuous investigation is noted below:-

One technically trained graduate on Rs.80/- p.m.	.. Rs. 80/-	p.m.
Two men:- 1 on Rs.1-4-0 a day and the second on Re.0-12-0 a day or say Rs.2/- a day (26 days).	.. 52/-	"
Power charges at Re.0-0-6 per K.W.H.	L.S. 600/-	"
Charcoal and Coke.	.. 60/-	"
Refractories and other spare materials	.. 60/-	"
Pressing & other mechanical work.	.. 100/-	"
	.. Rs.952/-	"
	or say Rs.1,000/-	p.m.

The experimental work may last for a period of about six months. If a grant as required above is sanctioned, it would be possible to conduct further trials.

==========
/Copy/

Viswanath
General Manager.

Bhadravati,

D/27-4-1944.
BN/

D.O. No. 353/43

To

The Ge Manager
M. I. Ltd
Bhadravathi

Sir,

Subj: Arc & Graphite Electrodes

With reference to your letter No. 866/3 dated the 27th April 1944 on the above subject I am directed to state that as already intimated to you on 21.4.44 & in pursuance of the suggestion of Mr. D.V. Krishna Rao, Dy. Ram Prasad is urged that the grant to staff asked for may be provided, so that the work may be carried out expeditiously

I am to request you

Therefore to be on guard of
to intimate the action I am
prepare to take in the matter
also to indicate if the grant
asked for by Mr. Krishna Rao
cannot be considered I am in
favour of the ~~if not for~~
~~what reasons~~

The favour of an early reply
is requested

Yours
[illegible]
~~Yours~~
Yours
4/5

THE MYSORE IRON & STEEL WORKS
(GOVERNMENT OF MYSORE)

TELEGRAMS:
"MYSIRON"

BHADRAVATI
(MYSORE STATE RLY.)

Ref. No. G/

19th May 1944.

The Secretary,
Board of Scientific and
Industrial Research,
General & Revenue Secretariat,
BANGALORE.

INDUSTRIAL RESEARCH
MAY 22 1944
No. 160

Dear Sir,

Subject:-Manufacture of Graphite Electrodes etc.

With reference to your letter No.I.P. 353/43-44 dated 5th May 1944, I beg to state that the amount provided for in the current year's Budget under Experiments in the Revenue Account has practically been used up, and I am proposing to obtain sanction of Government for providing the money required by reappropriation.

The supervisory staff who conducted the earlier investigation on the manufacture of graphite electrodes are very busily engaged just at present. I am however asking Mr.D.V. Krishna Rao, Works Manager, Metallurgical Division, to put one or two men on this special work and restart the investigation from where it was left off.

Yours faithfully,

Biswant

General Manager.

BN/ 19.5.

GENERAL AND REVENUE SECRETARIAT.

ANNUAL REPORT OF THE BOARD OF SCIENTIFIC AND INDUSTRIAL RESEARCH FOR THE YEAR 1943-44.

I. PERSONNEL.

The Board of Industrial Planning and Co-ordination was reconstituted as the *Board of Scientific and Industrial Research* during the year, mainly with a view to widening the scope of its activities, particularly in the field of industrial research and investigations in the State which are of vital importance to the industrial development of the country and to maintain a closer and more effective liaison with the Board of Scientific and Industrial Research, Government of India, so that the State could benefit from the research conducted under the auspices of the latter Board (G. O. No. D. 4807-1902—I. & C. 194-43-2, dated the 26th January 1944).

The other activities of the Board of Industrial Planning and Co-ordination in connection with the work relating to planning and co-ordination, including those of the utilisation of the results of research, starting of new concerns, as distinct from research, reviewing the work of the departments in respect of war supplies and civil production were entrusted to a new committee styled the "Industrial Planning and Co-ordination Committee" (of the Board of Industries and Commerce) constituted for the purpose. The Secretary, Board of Industries and Commerce was also appointed as the Secretary of this new committee whose functions form part of the Economic Conference (G. O. No. D. 5312-400—I. & C. 194-43-3, dated the 21st February 1944).

The Assistant Secretary to Government, Development Department continued to be Secretary of the Board of Industrial Planning and Co-ordination (reconstituted as Board of Scientific and Industrial Research) during the year and Dr. K. A. N. Rao, D.Sc., F.I.C., Technical Assistant to the Government Director, Industrial Concerns was

appointed as the Joint Technical Secretary of the reconstituted Board with effect from the 23rd November 1943. The activities of the Board continued to be a part of the General and Revenue Secretariat as heretofore. With a view to having the benefit of the advice of scientists and leading businessmen, Sir C. V. Raman, Sir M. O. Forster, Sir J. C. Ghosh, *Dharmaprakasa* Devarao Shivaram, and Mr. S. L. Mannaji Rao, who kindly agreed to serve on the Board were appointed as members thereof.

During the year the Director, Engineering and Chemical Industries and the Director of Sandalwood Oil Factories were also appointed as members of the Board vice the Government Director, Industrial Concerns and the General Manager, Mysore Iron and Steel Works. The revised personnel of the reconstituted Board and the new Industrial Planning and Co-ordination Committee are given in appendices 'A' and 'B'.

II. Meetings and Attendance.

There were two meetings of the Board during the year. One of the special features during the year was the *Joint Session of the Central and Mysore Boards of Scientific and Industrial Research* which was held in November 1943.

III. Sub-Committees.

There were ten sub-committees functioning under the Board of Industrial Planning and Co-ordination at the beginning of the year.

The following sub-committees of the Board completed the work entrusted to them and were dissolved after the work done by them was reviewed :—

(1) Manufacture of Hydrated Lime sub-committee
(2) Do Abrasives sub-committee.
(3) Do Plastics sub-committee.
(4) Do Bobbins sub-committee.
(5) Do Cement Asbestos sub-committee.
(6) Do Parachute Cloth sub-committee.
(7) and (8) Location of Sulphur and Cultivation of Cinchona.

The Graphite Electrodes sub-committee was treated as a sub-committee of the Board of Scientific and Industrial Research and it continues to function. The work done by the sub-committees is dealt with in Chapter VI.

IV. Exploitation of Schemes Investigated.

(1) Establishment of a centralised Kaolin mining and refining industry in Bageshapura.
(2) Manufacture of bobbins on a small scale.
(3) Manufacture of parachute cloth and its components.
(4) Manufacture of chromium oxide at the Lac and Paint Works.
(5) Manufacture of metal polish at the Government Soap Factory.
(6) Manufacture of Tailor's chalk.
(7) Manufacture of Nitric acid and Hydrochloric acid at the Mysore Chemicals and Fertilisers.

V. Special Surveys.

(*a*) *Survey of Industrial Researches in the State.*— The survey was done during the year.

(*b*) *Survey of Occupational Diseases among Industrial Employees in the State.*— This work was transferred to the newly constituted Industrial Planning and Co-ordination Committee.

VI. Review of Work Done.

1. *Manufacture of Hydrated Lime Sub-Committee.*—The investigations conducted by the Department of Geology in pursuance of the decisions of the sub-committee have disclosed that it would not be economical to take up merely the production of hydrated lime from the locally available limestone. The sub-committee was dissolved.

2. *Manufacture of Magnesite Bricks.*—The investigations could not be taken up for want of facilities. The establishment of a separate Refractories Department in the Mysore Iron and Steel Works has been sanctioned and further work is in progress. No sub-committee has yet been constituted.

3. *Manufacture of Cement Asbestos Sheets and Pipes Sub-Committee.*—The sub-committee having completed the work was dissolved during the year.

4. *Manufacture of Abrasives Sub-Committee.*—The advance of Rs. 15,000 sanctioned to Mr. P. S. Narayana to further improve the industry was refunded by him during the year.

As the investigations had been successfully completed and exploited, the sub-committee was dissolved during the year.

5. and 6. *Location of Sulphur and Cultivation of Cinchona.*—These subjects are still under investigation by the departments. No sub-committees have been constituted. These will be further pursued.

7. *Manufacture of Bobbins Sub-Committee.*—The sub-committee has completed the work and the investigations have been successful. A few artisans in Bangalore City have already taken up the manufacture though on a small scale. The subject has been transferred to the Industrial Planning and Co-ordination Committee and Commerce for review and necessary further action.

8. *Manufacture of Plastics Sub-Committee.*—The particular work entrusted to the plastics sub-committee having been completed the sub-committee was dissolved Further work in the manufacture of formaldehyde moulding powder is however in progress in the Mysore Iron and Steel Works. The proposal to float a Joint Stock Company for the manufacture of plastics was separately, under examination.

9. *Manufacture of Parachute Cloth Sub-Committee.*—Large scale manufacture of parachute cloth and its components has been taken up and the sub-committee was dissolved.

10. *Manufacture of Graphite electrodes Sub-Committee.*—This sub-committee was affiliated to the Board of Scientific and Industrial Research. Further work is proposed to be restarted at the Mysore Iron and Steel Works for the personnel of the sub-committee, please *see* Appendix 'C.'

11. *Utilisation of Molasses for the Recovery of Potash Salts.*—The investigations were continued at the Mysore Sugar Company during the year.

12. *Manufacture of Silkworm Guts.*—The subject was transferred to the Industrial Planning and Co-ordination Committee.

13. *Manufacture of Potassium Permanganate.*—Further experiments in the Government Dichromate Factory were in progress during the close of the year.

14. *Chemical Engineering and Chemical Process.—Establishment of a Central Research Institution.*—With a view to examining the question in greater detail and submitting specific proposals, a committee with the personnel noted in Appendix 'C' was appointed during the close of the year. This subject was also discussed at the joint session of the Mysore and Central Boards.

15. *Manufacture of Nitrogenous Fertilisers in Mysore.*—The proposal was to increase the production of ammonia at Belagula to about 2½ tons per day and manufacture from it ammonium sulphate, phosphate, nitrate and urea required for the State and also by the neighbouring areas. The question was discussed at the joint session and the question has been taken up with the Government of India.

16. *Distillation of Essential Oils.*—From the investigations conducted so far regarding the cultivation of essential oil bearing plants, it has been established that cinnamon, davana, vetiver, cardamom, patchouli, geranium, eucalyptus, citronella grass, lemon grass, peppermint, mexican lavender (linaloe) and camphor trees could be grown successfully in Mysore and oil of good quality could be distilled from them. The question of developing the industry further and of having a bigger and central institution where not only the manufacture of known oils but also investigations on new plants and new oils could be carried out was under consideration. This was discussed at the joint session and the President of the Central Board promised to afford all necessary help in this behalf.

17. *Manufacture of Sulpha-drugs.*—The question of manufacture of sulpha-drugs like Sulphanilamide and Sulphathiazole at one of the Government Laboratories had been under consideration for some time past and some experiments had been carried out with success. The development of this line in Mysore, especially as some of the raw materials were available locally, was under consideration.

18. *Furfural.*—The possibilities of the manufacture of furfural from the raw materials available in Mysore—rice bran, saw dust, bagasse, etc.,—was examined at the Mysore Iron and Steel Works. Small quantities had been made in a locally designed and fabricated plant. The

further improvements necessary for this plant to obtain better yield were under consideration.

19. *Manufacture of Alkali.*—The subject was discussed at the joint session and the question of rendering necessary assistance was also taken up with the Government of India.

20. *Utilisation of date palm juice.*—The possibilities of manufacturing jaggery, sugar, and alcohol from the juice of the date palm in Sira, Madhugiri and other areas was examined by a committee appointed for the purpose, *vide* personnel in Appendix C. The Committee has furnished a very useful report and this was under examination during the close of the year.

In addition the following subjects were also under the consideration of the Board :—

(1) Chemical industries starting from calcium carbide.

(2) Mining of copper ore near Sowanahalli for the manufacture of copper sulphate.

(3) Sorbitol and other higher polyhydric alcohols.

(4) Manufacture of nichrome wire.

(5) Manufacture of sparking plugs.

(6) Manufacture of acetic acid at the Mysore Iron and Steel Works.

(7) Manufacture of saccharine in the Mysore Chemicals and Fertilisers.

(8) Manufacture of air depolariser cells at the Government Porcelain Factory.

(9) Manufacture of carborundum.

(10) Manufacture of Phosphorus.

(11) Manufacture of Lantana oil.

(12) Manufacture of Resistance alloys.

(13) Manufacture of Dyes from Saw dust.

(14) Manufacture of Plastics from coffee beans.

APENDIX A.

PERSONNEL OF THE RECONSTITUTED BOARD OF SCIENTIFIC AND INDUSTRIAL RESEARCH.

The Minister for Industries and Supplies (*Chairman*).

The Secretary to Government, Development Department.

The Chief Conservator of Forests in Mysore.

The Director of Industries and Commerce in Mysore.

Do Engineering and Chemical Industries in Mysore.

Do Sandalwood Oil Factories in Mysore.

The Secretary, Economic Conference (also Commissioner, Development and Planning).

The Director of Geology in Mysore.

Dr. B. K. Ram Prasad, D.Sc., General Superintendent, Jog Power Scheme.

Sir M. O. Forster, F.R.S, D.Sc., Ph.D., F.I.C., Old Banny Mantap, Mysore.

Rajasabhabhusana Sir C. V. Raman, M.A., D Sc., F.R.S., N.L., Bangalore

Sir J. C. Ghosh, D.Sc., F.N.I., Director, Indian Institute of Science, Bangalore.

Dharmaprakasha Deva Rao Shivaram, Bangalore.

Mr. S. L. Mannaji Rao, Bangalore.

The Assistant Secretary to Government, Development Department (*Secretary*).

Dr. K. A. N. Rao, D.Sc., F.I.C., Technical Assistant to the Director Engineering and Chemical Industries (*Joint Technical Secretary*)

APPENDIX B.

PERSONNEL OF INDUSTRIAL PLANNING AND CO-ORDINATION COMMITTEE.

The Minister for Industries and Supplies (*Chairman*).

The Commissioner, Development and Planning.

The Secretary to Government, Development Department.

The Director of Industries and Commerce.

The Government Director of Industrial Concerns.

The Director of Geology in Mysore.

The Chief Conservator of Forests in Mysore.

The General Superintendent, Cauvery Power Scheme.

The General Manager, Mysore Iron and Steel Works.

Mr. S. G. Sastry, M.Sc. (Lond.), Retired Director of Industries and Commerce.

The Secretary, Board of Industries and Commerce (*Secretary*).

APPENDIX C.

PERSONNEL OF COMMITTEES OF THE BOARD FUNCTIONING AT THE CLOSE OF THE YEAR.

(1) *Manufacture of Graphite Electrodes Sub-Committee.*

Dr B. K. Ram Prasad, D.Sc., General Superintendent, Jog Power Scheme (*Convenor*).

The Superintendent, Open Hearth Furnace, Mysore Iron and Steel Works.

One Chemist from the Mysore Paper Mills.

One Chemist from the Indian Institute of Science.

(2) *Establishment of a Mechanical Engineering Workshop Committee.*

Sir J. C. Ghosh, D.Sc., F.N.I., Director, Indian Institute of Science.
Mr. W. O. Stoker, Superintendent, Manufacturing Division, Hindustan Aircraft, Bangalore.
The Director of Engineering and Chemical Industries.
Do Sandalwood Oil Factories.
The Principal, Engineering College, Bangalore.
The Director of Industries and Commerce.
The Commissioner, Development and Planning (*Convenor*).

(3) *Utilisation of Date Palm Juice Committee.*

The Commissioner, Development and Planning (*Chairman*).

The Director of Industries and Commerce.

Do Agriculture.
The Government Director, Industrial Concerns.

The Excise Commissioner in Mysore.

Dr. K. A. N. Rao, D.Sc. Joint Technical Secretary, Board of Scientific and Industrial Research (*Secretary*).

WD 749—GPB—100—16-12-44

320 P. of 25/5

To.

The Gl Superintendent
Tog Power Scheme &
Cement, Graphite Electrode
Sub Committee.

Sir,

Subj:- Graphite Electrode Sub Committee

I am directed to state that the above Sub Committee constituted in the year 1960-1 is dissolved, as the work entrusted to it has already been completed & further investigations are now carried on at the M. Dpo. I. Cl

for 16/5/65
Sec'y to
B.S. & M.

1) Copy to the Gl. Manager.
M. Dpo.

2) Copy for Compliance.

for Sec'y to B.S. & M.

321-2

of 25/5.